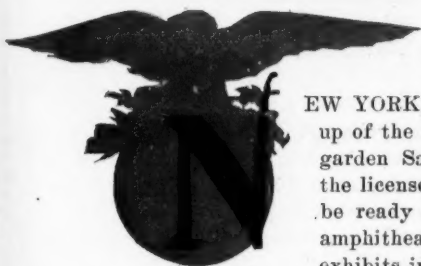


# MOTOR AGE

*Garden Show Ready*



NEW YORK, Jan. 12—All Seldendom awaits the ringing up of the curtain on the ninth show in Madison Square garden Saturday evening, January 16, when all that the licensed makers have ready for the 1909 buyer will be ready for inspection in the big, brilliantly-lighted amphitheater. That all the makers will have their exhibits in place before the opening hour is a foregone

conclusion; in fact, many of them have had their cars and parts ready for months waiting the necessary day of shipment and the installation in the booths. The January show has made it easy for the maker to get his exhibits ready as compared with the early November show of 14 months ago when it was almost an impossibility to have the cars in place for the opening hour.

The A. L. A. M. committee in charge of affairs has everything well in hand, the decoration scheme for the whole interior having been settled months ago, while all the many parts entering into the makeup of the scheme have been completed so that when the garden is turned over to the decorators it will not be long before it will be translated into a new place. The head carpenters, decorators, painters and electricians with more than ten-score attendants are capable of pushing activities along a dozen lines at once, and with such concerted action the grand transformation scene is soon accomplished. The general floor plan of the exhibits will be the same as at the last show with the car exhibitors extending in an oval around the walls on the main floor and in two lines on the oval space inside of the broad aisle. On either side of this on a higher level the remainder of the car exhibitors will be placed. The commercial cars will be housed in the basement and the electrics in the banquet hall. Room has been allotted to the scores of accessory exhibitors who will display their wares from the first and second galleries surrounding the amphitheater from the basement and the second floor of the concert hall.

Not the least important part of the exhibits will be the space occupied by the motor cycle makers who will be on hand in full strength. These speedy two-wheel little brothers of the big cars have made innumerable friends during the year and the list of exhibitors is longer than ever before.

In the date fixed for the show, there is a tacit recognition by the motor car makers of the changed character and new commercial value of motor car shows. The last one in the garden was held during the first week in November and the approaching exhibition marks the second time that the show date has been moved along from the fall to January. It is now accepted that the show is for the public, the individual enthusiast, the buyer and user, although conducted by the makers and not by the retailers.





Some Officials and Members of the A. L. A. M.

This is the essential difference between the national two shows in New York and Chicago, and those of Boston, Philadelphia and elsewhere. In former years it was considered that the show was a trade event, one arranged by the manufacturers for the dealer. Then the dealers waited till show time before making their commitment as to the cars they would handle during the ensuing year. At the show the manufacturer expected to book his agents and close his contracts with them for the number of cars they would handle. The business done direct with users was deemed of secondary consequence. This condition was largely a theory, always. It was more or less a fact during the first two or three shows, but the January date was too late for agents. They began to close their deals with the manufacturers early in the fall and by show time most of the big makers had no interest in making new agents and the show was merely a public educator and stimulus, at which a fair amount of retail orders was booked. Still the theory held that the manufacturers ran the shows for the benefit of agents, and its influence was noticed when, after two shows in the fall and five in January, the eighth show was set back to the first of November. The result demonstrated that the show is now an exposition for the public and not a trade affair, and that January, and not November, is the better time for the public.

To the motor car connoisseur from out of town who comes to find out the many improvements made in the new cars little explicit information can be given outside of that contained in other pages of this issue. The improvements of the year cannot always be gleaned from a superficial glance, although in a few instances it is possible to note many changes with a fleeting glance. First of all come the bodies, and in this by far the greatest change is the general lineup of toy, pony, midget, miniature or any other tonneau name the spectator wishes to use. Stearns introduced this body type a couple of years ago, and although it had a limited following in 1908 it has usurped the premier seat for 1909. Much latitude has been used in the construction of these bodies; in some cases it is impossible to differentiate between them and a five-passenger touring car, but if the salesman calls it a toy tonneau it ends there, even if it has space for a score.

The characteristic toy tonneau is one with scarcely enough foot room to allow of straightening the legs; this may seem a little extreme but even such as compared with the runabout of 1908 is exceedingly luxurious. Many makers apparently are poorly reconciled to the real toy tonneau with its abbreviated door at one side, and in ultra-extreme cases no door at all. These makers appear to want to build a four-passenger touring car, preferring to call it a toy tonneau. The aim has been to get a light tonneau car with seating for at least four, although the majority state five can be carried. A criticism that might be aimed at many of the young crops of toy tonneaux is the location of the back seat far in rear of the axle; in fact, as far to the rear as in the standard five-passenger cars. The fault with this would appear to lie in the bad riding, owing to the less weight carried. This can be overcome by suiting the springs to the car weight. A suggested policy is that of increasing the wheelbase so as to have the rear axle back of the seat line, and if possible push the front axle ahead into the radiator plane or in advance of it if possible. The result will be a long wheelbase for passenger load, but it will be a well suspended vehicle and one with particularly easy control.

Next to the toy tonneau the show visitor may look for the town car, or its industrial cousin, the taxicab. The town car is one more example of the old saying, "Necessity is the mother of invention." The limousine or the big chassis was introduced and is admirably filling a big field, such as for theater and family service, but it is ill-



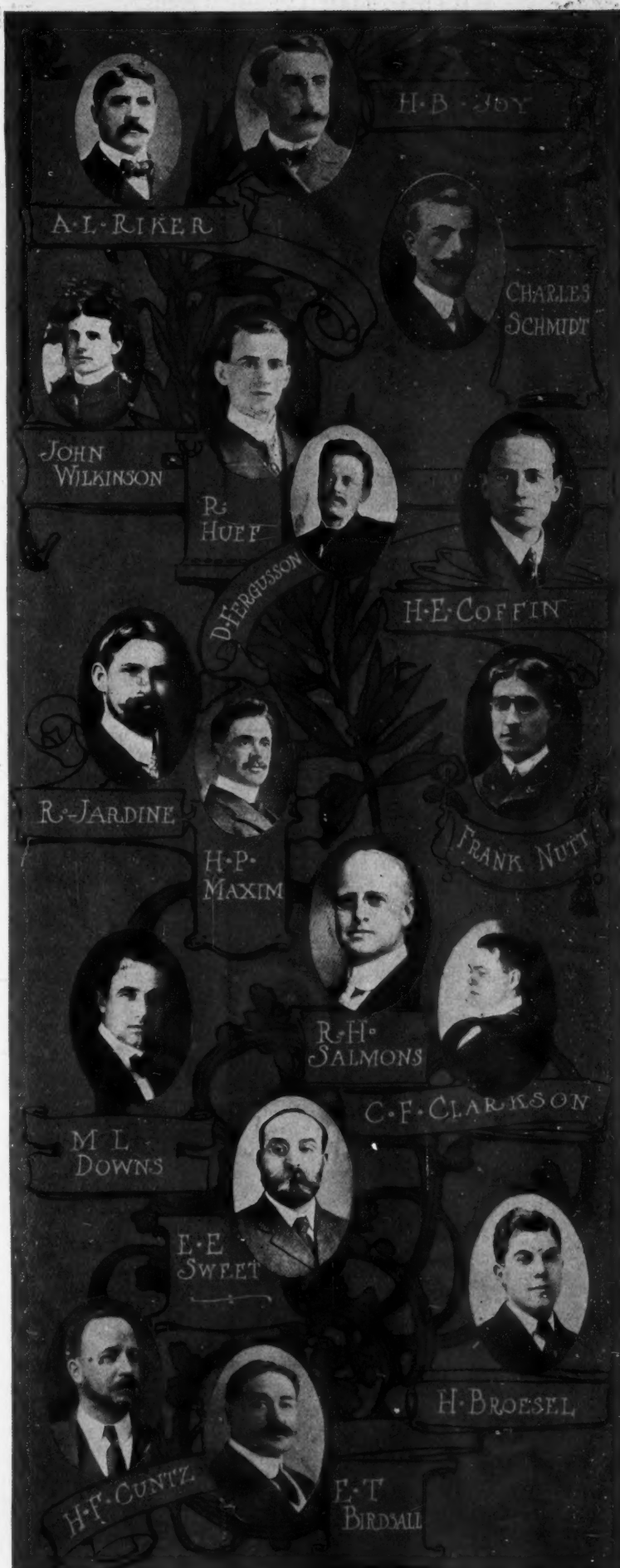
suited for the business man to go from his home to the office in the winter morning. In this role the objections to it are weight and space. In congested traffic centers the town car is quicker and more easily handled. It can be turned in the narrowest streets without reversing.

The landaulet type of car has also increased considerably during the last year, although its introduction has not been so general except in the taxicab line as was expected. For the ordinary user it is luxurious, and for the man of wealth who keeps half a dozen cars it is but one of his many. The seven-passenger touring car is still manufactured but not in the quantities it was a year ago, which is accounted for by the diversity of other body types that have been making inroads in its domain. A majority of the makers carry it on a separate chassis with greater horsepower, and it is noticeable that not a few details of chassis construction are altered where the seven-passenger load is carried.

Leaving the body consideration, the fastidious motorist will find prolific evidences of design and manufacture in the hidden parts of the chassis, and it will not be hard to distinguish what cars have been vastly improved during the past year and what others are exhibited practically the same as they were a year ago. Many of the chassis improvements cannot be noticed in a casual glance, but require pointing out in that there is no exterior indication of them. In this connection might be mentioned the changes made in metals in which is included the more general introduction of chrome nickel steel, the adoption of Vanadium steel, and the use of high carbon steels in many places. Coupled with the introduction of these steels is the finer workmanship that has been done on many of the car parts. Where 3-1000-inch latitude was permissible a year ago the limit is now 1-1000, which is a good indication of the careful inspection that factory superintendents are carrying out. Closely allied with the material phase of the motor car improvement, is the reduction of weight in many car parts, which, although it appears of small consequence when viewed alone, is a factor of considerable importance when the sum total of the car is looked into. The reduction of weight must not be translated as a reduction of strength, rather the tensile strength has been greatly increased in places owing to the quality of steel employed.

In the motors the spectator cannot but note the tendency towards casting cylinders in pairs, there being three or four examples of manufacturers who have heretofore adhered to the separately cast cylinder, but have at last introduced the twin casting. The four-cylinder motor with cylinders cast en bloc has arrived, but up to the present few examples of it are to be found. It is expected that before the next Madison garden show the number will be greatly increased. The visitor will find that the six-cylinder motor has made headway during the year, the salvation of it being in the introduction of what is known as the small six by many makers, in which the cylinder bore is less than 4 inches in many cases. This cylinder size gives a power sufficient for the demands and allows of the flexibility desired by many car users. A novelty is the six-cylinder Thomas with cylinders cast in threes.

In reviewing the transmission systems the increased number of disk clutches cannot be overlooked, nor can the placing of them in a separate oil-tight compartment in the forward end of the gearbox be missed. There has been no reduction in the number of disks employed, in spite of the fact that several makers predicted at the last show that seven to nine disks would be the popular number. The facts are that from forty to fifty disks are employed in a great many types. While the disk has been gaining friends the other types have been holding their own but not gaining. Those who place their confidence in the cone clutch have improved it by the introduction of cork inserts and leather, or placing flat springs beneath the leather facing.



A. L. A. M. Members and Engineers

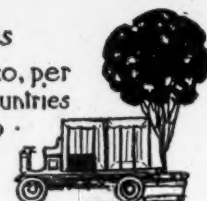


Published Weekly  
The Class Journal Company  
1200 Michigan Avenue, Chicago  
New York Office, 239 West 39th Street

# MOTOR AGE

Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, under Act of March 3, 1879

Subscription Rates  
United States and Mexico, per year, \$3.00 Other countries including Canada, \$5.00



## Uniformity and Attention to Details Needed



**P**ROGRESS in the design and manufacture of a motor car is not measured in feet and inches, in ounces or pounds, in dollars or cents, but in the general harmonious advancement of the many systems that go to make up a complete car. The experiences of 2 or 3 years ago taught the American citizen that a motor car with a 75-horsepower engine and poor brakes is a very unprofitable and exceedingly dangerous investment. Experience, that steel-flint tutor of all ages, is never slow to punish where man errs, and it is an unalterable rule of humankind that due punishment follows every offense. Nature dictated this rule when the foundations of the world were laid, and it has never been violated since.

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**M**ANY motor car designers and manufacturers have been consistent violators of the law of supply and demand, which translated into motor car language, means the commensurate strength of a part for the duty imposed upon it. The violations of this have not been wilful; in many cars they have not been due to ignorance, but rather to lack of time. Presidents of motor car organizations have considered one engineer sufficient for a 2,000 a year output, at the same time making him the be-all and end-all of the complete factory. The result is the engineer has not had sufficient time to keep the many systems of the motor car in proper prospective and to embody in them that nicety of relationship which skilled engineering and successful manufacture demands. The result of this has been a rather one-piece-at-a-time development of a motor car. A few years ago it was the quiet motor, no matter how attained, whether by the expenditure of dollars on the muffler, or sound engineering on the parts going to make up the motor. At this juncture Glidden tours told of the necessity of brakes and springs, and there was a landslide of attention towards these parts. One outward indication of this was the unprecedented increase in the number of concerns that sprung up to manufacture shock absorbers. At another time features of frame construction received attention. Another year it was ignition, and this year it is lubrication. Every season has its special lines, and while the major attention should be given these the multitudinous other parts should not be overlooked.

★ ★ ★

**T**HIS brief enumeration but shows the one-sided progress that the motor car has made, the program being a part at a time rather than the whole. It is impossible to get away from Euclid's definition that a whole is greater than any of its parts, and the sum total of a motor car is greater than the brakes, carbureter, the clutch, frame, the axles, the springs, and the body. What is needed most in many cars is a more uniform carrying of all of the parts to a state of perfection on a par with that of the strongest part of the car. An indication of this is the fact that many of the machines contesting in severe reliability contests and road races are put out of the running because of breakages in small parts, parts which the engineer said, "I never thought they would give any trouble." The chain is as strong as its weakest link, and in a road race, in a hill climb, or in an endurance contest, the car is as strong as its weakest part. If a world famous racing car loses a grand prix, because of breaking a

spring, the result is as serious as if it cracked a cylinder. The great public knows it lost, and it often fails to inquire closely as to the reason.

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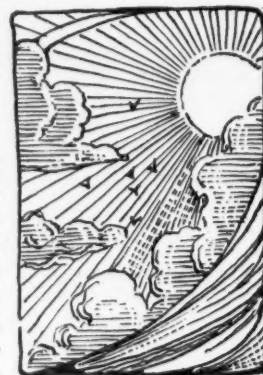
**M**ANY of the most successful men in business enterprises are those with greatest capabilities for detail; not a few of the greatest works of art have received their recognition because of perfection in the minutest parts; leading statesmen have been dethroned from the premier positions in the country by the slightest misrepresentation; and greatest consequences have emanated from the most obscure beginnings. So in the motor car mart! It frequently happens that small things work the greatest worry to the owners and produce the heaviest losses to the manufacturer. These are the little things that the engineers are often too busy to look after; these are the details that caused the fracture or break that detracts from the good name of a certain make of car; and these are the weak points that the public so frequently hear about while the big, good points pass unnoticed. From this it would be rash to conclude that big things must be neglected and small things magnified; rather the medium course is counseled, that course in which the details are carried on in due relationship to the other parts.

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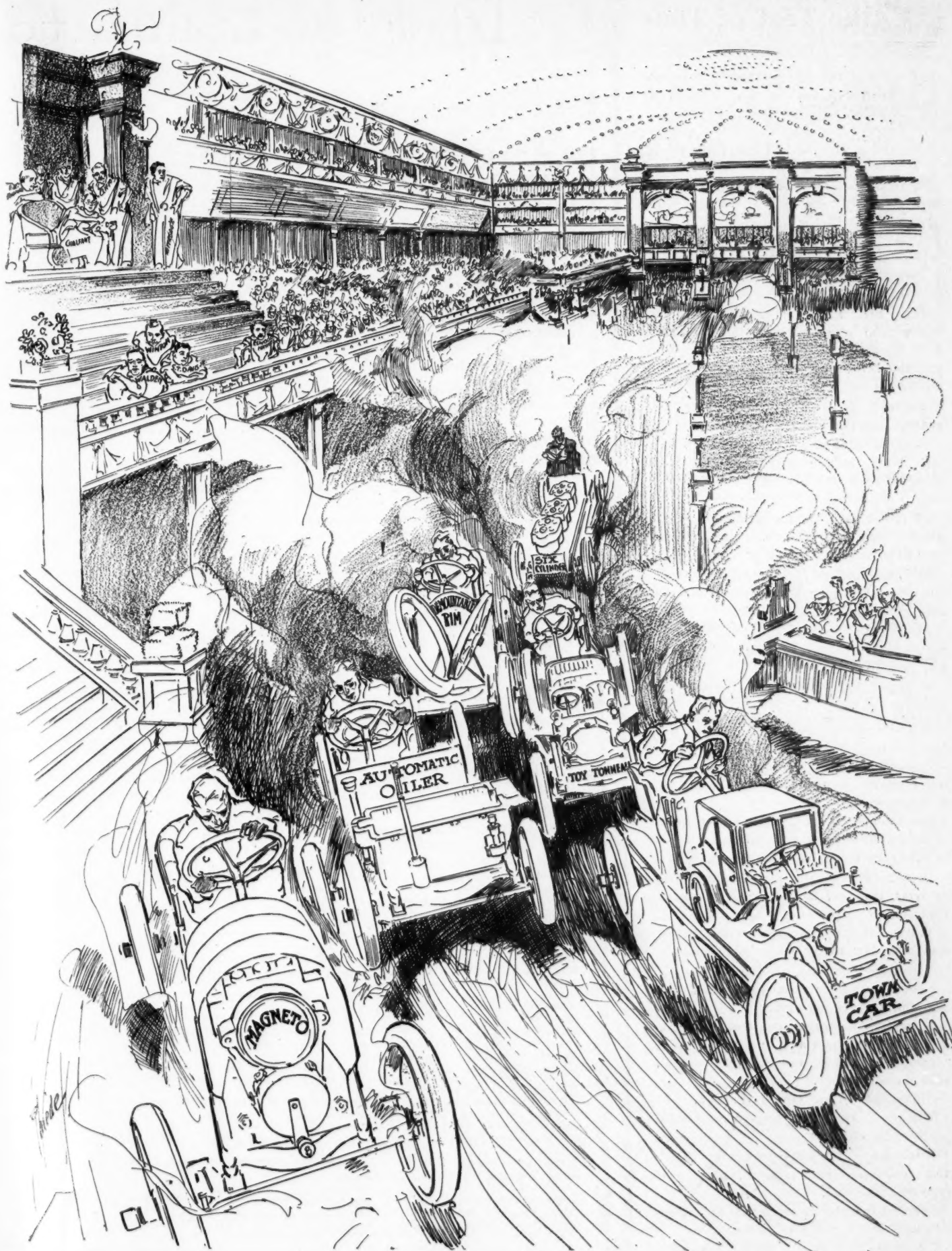
**P**ROGRESS in an industry does not necessarily mean progress in one particular avenue, in spite of the fact that specialization is a paramount condition of the present century. The day is now passing when one concern will pin its entire faith to one model, excepting where the price is such that it is imperative to manufacture but one of a kind. The motor car field is broadening so rapidly at the present time that a touring car or a runabout is but one of its small channels. The taxicab has taken its place, so has the town car, so has the light delivery wagon, so has the heavy truck, and so have the agricultural motors, the fire wagons, the fire engines, the ambulances, and the myriad other industrial types. The commercial field will soon offer greater inducements than the pleasure car field, but many makers will not be prepared for its coming. Some of the more considerate have been listening to the winds whispering through the branches and have been preparing, while others, solely engrossed in the manufacture of pleasure vehicles, have not as yet heeded the call of the commercial Macedonian. When the demand comes, as come it will, they will find themselves unprepared. They will further find it impossible to bring out a successful truck in the course of a month or 2 and they will additionally discover that, while they are experimenting, the maker who has been watching the trend of the times will have captured the early market.

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**I**T is expensive to manufacture special cars, but the selling price is commensurate with it, and while the profits are much smaller than those obtained from straight car manufacture, the experience gained is most valuable. There is no royal road to manufacture; it is a combination of engineering principles, careful production and close watchfulness; and only those concerns can obtain ultimate success that attend to all three. More factory interior economy is needed.







The Circus Maximus at Madison Square Garden

## Old Ideas Stand the Test of Time

IN spite of the many changes from year to year, new brakes, new clutches, improved axles, redesigned gearsets, worked-over rear axles, slightly-altered steering gears and a hundred and one other things, it is interesting to note some of the constructions that have been handed down to us from away back in 1905, '06 and '07—times which, in the grand lapse of ages, are but yesterday or this forenoon, but when viewed in the fierce light of motor progress seem as quite distant milestones in motoring history.

In a review of the exhibits the newcomer who was not interested in motor lore 3 years ago would do well to have explained to him some of the following mechanical stand-bys:

Packard—Expanding clutch, rear axle gearset and two-plunger oil pump.

Peerless—One-piece crankcase, expanding clutch, unique wiring scheme, four-speed gearset and arched rear axle with universal joints.

Pierce—I-beam motor supports, pump-gravity oiling system and semi-floating rear axle.

Haynes—Roller pinion drive, ratchet master gear in gearset, one-piece live rear axle and vertical torsion bar.

Locomobile—Make-and-break ignition, manganese bronze crankcase and gearbox and jackshaft brakes.

Apperson—Krebs type of carbureter and contracting band clutch.

Winton—Air-pressure self-starter; disk clutch carried in gearbox and twin springs.

Stearns—Two-jet carbureter, ball-bearing crankshaft, one-piece crankcase and motor arm oiler.

Stevens-Duryea—Three-point suspension of unit power plant, flywheel on front end of crankshaft and ball-bearing crankshaft.

Pope-Toledo—Double-action valve rocker arms, inverted U frame and suspended front axle.

White—Steam generator with thermostat and flow motor water regulators.

Franklin—Separate cooling flanges for cylinders, auxiliary exhausts, wood frames and full elliptic springs.

Knox—Valve-in-the-head motor, detachable cylinder heads and unit power plant.

Cadillac—Copper waterjackets, detachable cylinder heads.

Studebaker—Low-tension ignition.

Lozier—Enamelled cylinders and multiple-disk clutch.

Matheson—Detachable cylinder heads and make-and-break ignition, also pump type of carbureter.

Corbin—Interposed lever valve-lifter action and ball-bearing crankshaft.

Elmore—Two-cycle motors without valves or camshafts; and others.

# List of Exhibitors

## MAIN FLOOR

Knox Automobile Co...Springfield, Mass.  
Matheson Motor Car Co...Wilkesbarre, Pa.  
Elmore Mfg. Co...Clyde, O.  
Cadillac Motor Car Co...Detroit  
Pope Motor Car Co...Hartford, Conn.  
Royal Tourist Car Co...Cleveland, O.  
Autocar Co...Ardmore, Pa.  
Everitt-Metzger-Flanders Co...Detroit  
Corbin Motor Vehicle Corp...  
.....New Britain, Conn.  
Studebaker Auto Co...Cleveland, O.  
Lozier Motor Co...New York  
Electric Vehicle Co...Hartford, Conn.  
F. B. Stearns Co...Cleveland, O.  
Packard Motor Car Co...Detroit  
George N. Pierce Co...Buffalo  
E. R. Thomas Motor Co...Buffalo  
Chalmers-Detroit Motor Co...Detroit  
H. H. Franklin Mfg. Co...Syracuse, N. Y.  
Locomobile Co. of America...  
.....Bridgeport, Conn.  
Pope Mfg. Co...Hartford, Conn.  
Winton Motor Carriage Co...Cleveland, O.  
Stevens-Duryea Co...Chicopee Falls, Mass.  
Peerless Motor Car Co...Cleveland, O.

## ELEVATED PLATFORM

Selden Motor Vehicle Co...Rochester, N. Y.  
Haynes Auto Co...Kokomo, Ind.  
Simplex Auto Co...New York  
Hewitt Motor Co...New York  
Walter Automobile Co...New York  
Woods Motor Vehicle Co...Chicago  
White Co...New York  
Apperson Bros. Auto Co...Kokomo, Ind.

## EXHIBITION HALL

Waverley Co...Indianapolis, Ind.  
Electric Vehicle Co...Hartford, Conn.  
Rauch & Lang Carriage Co...Cleveland, O.  
S. R. Bailey & Co., Inc...Amesbury, Mass.  
Anderson Carriage Co...Detroit  
Babcock Electric Carriage Co...Buffalo  
Studebaker Auto Co...Cleveland, O.  
Baker Motor Vehicle Co...Cleveland, O.

## COMMERCIAL VEHICLE DEPARTMENT, BASEMENT

Knox Automobile Co...Springfield, Mass.  
General Vehicle Co...New York  
Champion Wagon Co...Oswego, N. Y.  
H. H. Franklin Mfg. Co...Syracuse, N. Y.  
Studebaker Automobile Co...  
.....South Bend, Ind.  
E. R. Thomas Motor Co...Buffalo  
Alden Sampson, 2nd...Pittsfield, Mass.  
Hewitt Motor Co...New York  
Autocar Co...Ardmore, Pa.

## ACCESSORIES—ELEVATED PLATFORM

B. F. Goodrich Co...Akron, O.  
Diamond Rubber Co...Akron, O.  
C. F. Splittorf...New York  
Goodyear Tire and Rubber Co...Akron, O.  
Shelby Steel Tube Co...Pittsburg  
Brown-Lipe Gear Co...Syracuse, N. Y.  
G & J Tire Co...Indianapolis, Ind.  
Briscoe Mfg. Co...Newark, N. J.  
Gilbert Mfg. Co...New Haven, Conn.  
Auto Improvement Co...New York  
American Electric Novelty and Mfg. Co...New York  
Vacuum Oil Co...New York  
Herz & Co...New York  
S. F. Bowser & Co...Fort Wayne, Ind.  
Gray & Davis...Amesbury, Mass.  
Veeder Mfg. Co...Hartford, Conn.  
R. E. Dietz Co...New York  
Atwater Kent Mfg. Works...Philadelphia  
Baldwin Chain Mfg. Co...Worcester, Mass.  
N. Y. and N. J. Lubricant Co...New York  
Warner Instrument Co...Beloit, Wis.  
Light Mfg. and Fdry. Co...Pottstown, Pa.  
Empire Auto Tire Co...Trenton, N. J.  
Autocoll Co...Jersey City, N. J.  
Swinehart-Clincher T. & R. Co...Akron, O.  
Remy Electric Co...Anderson, Ind.  
Dow Tire Co...New York  
Jones Speedometer...New York  
Conn. Tel. and Elec. Co...Meriden, Conn.  
Continental Caoutchouc Co...New York

Morgan & Wright...Detroit  
Spicer Universal Joint Mfg. Co...  
.....Plainfield, N. J.  
J. H. Sager Co...Rochester, N. Y.  
R. E. Hardy Co...New York  
Ajax-Grieb Rubber Co...New York  
Weed Chain Tire Grip Co...New York  
Consolidated Rubber Tire Co...New York  
Wheeler & Schebler...Indianapolis, Ind.  
Witherbee Igniter Co...New York  
Republic Rubber Co...Youngstown, O.  
Duff Mfg. Co...Pittsburg  
Chandler Co., Inc...Springfield, Mass.  
Michelin Tire Co...Milltown, N. J.  
Leather Tire Goods Co...  
.....Newton Upper Falls, Mass.  
Adam Cook's Sons...New York  
Avery Portable Lighting Co...  
.....Milwaukee, Wis.  
Globe Machine and Stamp Co...  
.....Cleveland, O.  
Janney-Steinmetz & Co...Philadelphia  
Firestone Tire and Rubber Co...Akron, O.  
Oliver Mfg. Co...Chicago  
Timken Roller Bearing Axle Co...Canton, O.  
Hartford Suspension Co...  
.....Jersey City, N. J.  
Pennsylvania Rubber Co...Jeannette, Pa.  
Manufacturers' Foundry Co...  
.....Waterbury, Conn.  
Motsinger Device Mfg. Co...Pendleton, Ind.  
Atwood-Castle Co...Amesbury, Mass.  
Byrne-Kingston Co...Kokomo, Ind.  
Wm. Cramp & Sons Ship & Engine Bldg. Co...Philadelphia  
A. W. Harris Oil Co...Providence, R. I.  
Brennan Mfg. Co...Syracuse, N. Y.  
Warner Gear Co...Muncie, Ind.  
Phineas Jones & Co...Newark, N. J.  
Standard Welding Co...Cleveland, O.  
American Ball Bearing Co...Cleveland, O.  
Badger Brass Mfg. Co...Kenosha, Wis.  
Fisk Rubber Co...Chicopee Falls, Mass.  
Diamond Chain and Mfg. Co...  
.....Indianapolis, Ind.  
Pittsfield Spark Coil Co...Dalton, Mass.  
Rose Mfg. Co...Philadelphia  
Whitney Mfg. Co...Hartford, Conn.  
Hartford Rubber Works Co...  
.....Hartford, Conn.  
A. R. Mosler & Co...New York  
Gabriel Horn Mfg. Co...Cleveland, O.  
Joseph Dixon Crucible Co...  
.....Jersey City, N. J.  
Heinze Electric Co...Lowell, Mass.  
C. T. Ham Mfg. Co...Rochester, N. Y.  
Valentine & Co...New York  
Hyatt Roller Bearing Co...Newark, N. J.  
Thomas Prosser & Son...New York

## BALCONY

McCord Mfg. Co...Detroit  
George A. Haws...New York  
C. A. Shaler Co...Waupan, Wis.  
William C. Robinson & Sons Co...  
.....Baltimore, Md.  
Cook's Standard Tool Co...  
.....Kalamazoo, Mich.  
A. O. Smith Co...Milwaukee  
Eastern Carbon Works...Jersey City, N. J.  
Allen Auto Specialty Co...New York  
Jeffrey-Dewitt Co...Newark, N. J.  
Morrison-Ricker Mfg. Co...Grinnell, Ia.  
New York Sporting Goods Co...New York  
Metal Stamping Co...New York  
Hydraulic Oil Storage Co...New York  
Hopewell Brothers...Cambridge, Mass.  
J. S. Bretz Co...New York  
Pierson Motor Supply Co...New York  
Havoline Oil Co...New York  
Apple Electric Co...Dayton, O.  
Isaac G. Johnson & Co...New York  
Auto Pump Co...Springville, N. Y.  
Rushmore Dynamo Works...  
.....Plainfield, N. J.  
English & Mersick Co...New Haven, Conn.  
E. M. Benford...Mount Vernon, N. Y.  
K. W. Ignition Co...New York  
Austro-American Separator Co...  
.....Cleveland, O.  
William R. Winn...New York  
New York Coil Co...New York  
Voorhees Rubber Co...Jersey City, N. J.  
American Thermos Bottle Co. of N. Y.  
.....Brooklyn  
L. J. Muttly Co...Boston



# at the A·L·A·M·Show

A. Z. Co. .... New York  
 High Frequency Ignition Coil Co. ....  
 .... Los Angeles, Cal.  
 H. H. Franklin Mfg. Co. .... Syracuse, N. Y.  
 Keystone Lubricating Co. .... Philadelphia  
 Leon Mann Co. .... New York  
 P. Reilly & Son. .... Newark, N. J.  
 Philadelphia Timer and Machine Co. ....  
 .... Philadelphia  
 Jarman & Baker. .... New York  
 R. I. V. Co. .... New York  
 Atlas Rubber Co. .... Buffalo, N. Y.  
 Champion Ignition Co. .... Flint, Mich.  
 Burnet Compound Spring, Inc. ....  
 .... Newark, N. J.  
 Buda Foundry & Mfg. Co. .... New York  
 Charles E. Miller. .... New York  
 Trenton Rubber Mfg. Co. .... Trenton, N. J.  
 O. W. Young. .... Newark, N. J.  
 Anderson Forge and Machine Co. ....  
 .... Detroit  
 M. H. Cormack & Co. .... New York  
 Geisler Brothers. .... New York  
 William P. Miller Sons. ....  
 .... Long Island City, N. Y.

## CONCERT HALL

Sprague Umbrella Co. .... Norwalk, O.  
 L. C. Chase & Co. .... Boston, Mass.  
 Noera Mfg. Co. .... Waterbury, Conn.  
 Columbia Lubricants Co. of New York  
 .... New York  
 Hess-Bright Mfg. Co. .... Philadelphia, Pa.  
 National Carbon Co. .... Cleveland, O.  
 Lunkenheimer Co. .... Cincinnati, O.  
 National Battery Co. .... Buffalo  
 Hoffecker Co. .... Boston  
 Westchester Appliance Co. .... Yonkers, N. Y.  
 Standard Roller Bearing Co. .... Philadelphia  
 Randall-Faichney Co. .... Boston  
 Edmund & Jones Mfg. Co. .... Detroit  
 Pantasote Co. .... New York  
 Electric Storage Battery Co. .... Philadelphia  
 Manhattan Screw and Stamping Wks.  
 .... New York  
 Springfield Metal Body Co. ....  
 .... Springfield, Mass.  
 Gemmer Mfg. Co. .... Detroit  
 C. Cowles & Co. .... New Haven, Conn.  
 Coes Wrench Co. .... Worcester, Mass.  
 Never Miss Spark Plug Co. .... Lansing, Mich.  
 Stewart & Clark Mfg. Co. .... Chicago  
 C. A. Mezger, Inc. .... New York  
 American & British Mfg. Co. ....  
 .... Bridgeport, Conn.  
 Rands Mfg. Co. .... Detroit

## SECOND TIER BOXES

Bosch Magneto Co. .... New York  
 Columbia Nut and Bolt Co., Inc. ....  
 .... Bridgeport, Conn.  
 H. A. Allers & Co. .... New York  
 Traver Blowout Patch Co. .... New York  
 Paul S. Reeves & Son. .... Philadelphia  
 Seamless Rubber Co. .... New Haven, Conn.  
 Sampson Leather Tire Co. .... New York  
 Davis-Bournonville Co. .... New York  
 Perfection Wrench Co. .... Port Chester, N. Y.  
 Erie Foundry Co. .... Erie, Pa.  
 Ernst Flentje. .... Cambridge, Mass.  
 Sireno Co. .... New York  
 Duffy Grease Co. .... New York  
 Coloris Mfg. Co. .... Philadelphia, Pa.  
 Union Battery Co. .... Belleville, N. J.  
 Chicago Wind Shield Co. .... Chicago

## THIRD TIER BOXES

Vesta Accumulator Co. .... New York  
 Mica Core Mfg. Co. .... New York  
 Nadall Mfg. Co. .... Chicago  
 Elite Mfg. Co. .... Ashland, O.  
 Auto-Tire Inflator Co. .... Brooklyn  
 American Electric Fuse Co. .... New York  
 A. Origet & Co. .... New York  
 John Lucas & Co. .... New York  
 Batavia Rubber Co. .... Batavia, N. Y.  
 H. & C. Bottle Mfg. Co. .... New York

A. O. Brictson. .... Brookings, S. D.  
 Standard Leather Washer Mfg. Co. ....  
 .... Newark, N. J.  
 Lux Auto Lamp Mfg. Co. .... New York  
 Quincy-Manchester-Sargent Co. ....  
 .... Plainfield, N. J.  
 Marko Storage Battery Co. .... Brooklyn

## BASEMENT

Patterson, Gottfried & Hunter. .... New York  
 Healy Leather Tire Co. .... New York  
 C. J. Downing. .... New York  
 Kitsee Storage Battery Co. .... Scranton, Pa.  
 Albert Champion Co. .... Boston  
 E. T. Burrows Co. .... Portland, Me.  
 Stromberg Motor Devices Co. .... New York  
 Julius King Optical Co. .... New York  
 Livingston Radiator Co. .... New York  
 White & Bagley Co. .... Worcester, Mass.  
 Veh'cle Apron & Hood Co. .... Columbus, O.  
 Hill Dryer Co. .... New York  
 American Thermo-Ware Co. .... Philadelphia  
 Auto. Supply Mfg. Co. .... Brooklyn  
 Lavalette & Co. .... New York  
 Perfection Spring Co. .... Cleveland, O.  
 Stanley & Patterson. .... New York  
 Vanguard Mfg. Co. .... Joliet, Ill.  
 Merchant & Evans Co. .... Philadelphia  
 Motz Clincher T. & R. Co. .... Akron  
 Post & Lester Co. .... Hartford, Conn.  
 Commercial Acetylene Co. .... New York  
 United States McAdamite Metal Co. ....  
 .... Brooklyn

## BASEMENT—Motor Cycle Department

Merkel Light Motor Co. .... Pottstown, Pa.  
 Consolidated Mfg. Co. .... Toledo, O.  
 Excelsior Supply Co. .... Chicago  
 N. S. U. Motor Co. .... New York  
 American Motor Co. .... Brockton, Mass.  
 Hendee Mfg. Co. .... Springfield, Mass.  
 F. A. Baker & Co. .... New York  
 Pierce Cycle Co. .... Buffalo, N. Y.  
 Ovington Motor Co. .... New York  
 Reading Standard Co. .... Reading, Pa.  
 Aurora Automatic Machine Co. ....  
 .... Aurora, Ill.  
 Royal Motor Works, Inc. .... Worcester, Mass.  
 Harley-Davidson Motor Co. .... Milwaukee  
 Auto-Bi Co. .... Buffalo, N. Y.  
 Thiem Mfg. Co. .... Minneapolis, Minn.  
 Motor Car Equipment Co. .... New York  
 Walton Motor Co., Inc. .... Lynbrook, L. I.  
 H. & F. Mesinger Mfg. Co. .... New York  
 G. H. Curtiss Mfg. Co. ....  
 .... Hammondsport, N. Y.  
 Eclipse Machine Co. .... Elmira, N. Y.  
 New Era Gas Engine Co. .... Dayton, O.  
 Reliance Motor Cycle Co. .... New York  
 Crouch Motor Co. .... Stoneham, Mass.  
 Persons Mfg. Co. .... Worcester, Mass.

## BASEMENT—Accessories

G. L. Economizer Co. .... New York  
 U. S. Spare Wheel Co. .... Detroit  
 Comptoir d'Innovations pour Auto. ....  
 .... New York  
 New Departure Mfg. Co. .... Bristol, Conn.  
 Nathan Novelty Mfg. Co. .... New York  
 Noonan Tool & Machine Works. ....  
 .... Rome, N. Y.  
 Pratt & Whitney Co. .... New York  
 Philadelphia Storage Battery Co. ....  
 .... Philadelphia  
 Troy Car. Sun Shade Co. .... Troy, O.  
 Garvin Machine Co. .... New York  
 Faultless Auto Tube Co. .... New York  
 George Stengee, Inc. .... Newark, N. J.  
 Blue Ribbon Auto and Car Co. ....  
 .... Bridgeport, Conn.  
 Dow Demountable Rim. .... New York

## New Things Worth Seeing in Garden

NEW faces are always interesting and the show visitor can see new models or new design at every motor car booth in the garden. Some of the most interesting things that should be visited because of being used for the first time this year by the respective makers are:

Pierce—Selective gearset with side control, fabric brakes and three-quarter elliptic rear springs.

White—New Joy valve action, one-piece crankshaft and pressed steel frame in small car.

Thomas—Six-cylinder car with cylinders cast in threes and gearset carried on rear axle.

Matheson—Six-cylinder model with jump spark ignition, cylinder in pairs and shaft-drive.

Locomotive—New shaft-driven 30-horsepower type.

Packard—Smaller edition of Packard Thirty, styled Packard Eighteen.

Franklin—Single magneto high-tension system of ignition and one model with automatic magneto control.

Studebaker—Bosch magnetic make-and-break plugs, improved water circulation, and dropped frame.

Chalmers-Detroit—New model Thirty, with cylinders en bloc, valves in the head, unit power plant, two-bearing crankshaft and three-quarter elliptic rear springs.

E-M-F—A brand new car with automatic lubrication acting on a new system, and rear axle gearset.

Cadillac Thirty—A new model with unique lubricating system and other features.

Peerless—New universals in rear axle and oiler incorporated in crankcase.

Apperson—Oiler under bonnet and new six-cylinder model.

Winton—New oiling system and many detailed improvements.

Stearns—Shaft-drive models and new town cab with rear axle gearset.

Royal Tourist—Improved double oiling system for motor.

Palmer & Singer—New six-cylinder models and town car with double dropped frame.

Autocar—New commercial vehicles.

Babcock—Electric taxicab and roadster type.

Studebaker—New shaft-drive electric.

Woods—Manganese I-beam frame for carrying motors.

Anderson—Roadster type of electric.

Baker electric—Many minor changes.

In all booths may be seen new body types such as toy tonneaux and a majority of the makers have runabouts. A few manufacturers have town cabs of lower power.

## History of Shows in the Garden

THE first motor car show in this country was held in Madison Square garden November 3-10, 1900. Although the credit of the idea has been given to the Automobile Club of America, it really originated with James P. Young, secretary and treasurer of the Madison Square Garden Co. Mr. Young sought the co-operation of the Automobile Club of America and the first show was announced as being under the auspices of the club. There were not enough exhibits to fill the space, even with a board track on the main floor, although motor cycles and motor triecycles were included with the motor cars.

In view of all that has since occurred, the list of exhibitors at that first garden show will be interesting now. Here it is:

Electric Vehicle Co., Riker Vehicle Co., Locomobile Co. of America, National Automobile and Electric Co., De Dion-Bouton Motorette Co., Waltham Mfg. Co., American Bicycle Co., Winton Motor Carriage Co., Mobile Co. of America, Baker Motor Vehicle Co., Autocar Co., Foster Automobile Mfg. Co., Automobile Co. of America, Woods Motor Vehicle Co., Stanley Mfg. Co., Canda Mfg. Co., Buffalo Electric Carriage Co., Daimler Mfg. Co., Holyoke Automobile Co., Knox Automobile Co., Overman Automobile Co., International Motor Carriage Co., Trinity Cycle Mfg. Co., John T. Robinson & Co., Peerless Mfg. Co., Springfield Cornice Works, St. Louis Motor Carriage Co., Haynes-Apperson Co., Strong & Rogers, Duryea Motor Co., Upton Machine Co., Automobile Club of America, Edmond Motor Cycle Co., New York Motor Vehicle Co., Munger Vehicle Tire Co., Steam Vehicle Co., Badger Brass Mfg. Co., Bevin Brothers Mfg. Co., E. A. Brecher & Co., Consolidated Rubber Tire Co., Crest Mfg. Co., Diamond Rubber Co., Dixon Crucible Co., Downing & Co., Dow Portable Electric Assistant Co., Gleason-Peters Air Pump Co., B. F. Goodrich Co., Goodyear Tire and Rubber Co., Gray & Davis, Hartford Rubber Works Co., Janney, Steinmetz & Co., Metallic Rubber Tire Co., Charles E. Miller, New Process Raw Hide Co., New York Belting and Packing Co., Pennsylvania Automobile and Gear Co., C. F. Splittorf, Veeder Mfg. Co., and Ware Brothers.

The second national show was held in Madison Square garden on December 2-9, 1901. Ninety-three exhibitors took space in this. The track was omitted this time, but again there was a loan exhibit of foreign cars in the cafe. No foreign exhibitors had space. There was no show in 1902 and the third one was held a year and 5 weeks after the second one, or during January 17-24, 1903. At this show the number of exhibitors totaled 150 and for the first time a foreign firm was an exhibitor; this was the Paris Automobile Co., represented by Henry Fournier. The fourth show and also the fifth, sixth and seventh were held in Madison Square garden during the corresponding third week in January each successive year. In 1905 the conduct of the show passed into the hands of the Association of Licensed Automobile Manufacturers, and it has since been under its auspices. The eighth show, as previously indicated, had its date moved backward, and it was held in November, 1907, the seventh annual show having been in January of the same year.

# Specifications of the Cars

NAME	MODEL	Price	BODY		H. P.		MOTOR			IGNITION		
			Type	No. of Seats	A.L.A.M. Other	No. Cyl.	Bore	Stroke	How Cast	Kind	Source	
Apperson.....	O	\$2450	T. C.	5	30	30	4	4 1/2	5	Sep.	J. S.	Bat. & H. T. M.
Apperson.....	L	3900			40	40	6	4	5	Sep.	J. S.	Bat. & H. T. M.
Apperson.....	M	3350	T. C.	5	36	36	4	4 1/2	5	Sep.	J. S.	Bat. & H. T. M.
Apperson.....	Jack Rab't	5000	R.	2	48	55	4	5 1/2	5	Sep.	J. S.	Bat. & H. T. M.
Apperson.....	K	4700	T. C.	7	48	55	4	5 1/2	5	Sep.	J. S.	Bat. & H. T. M.
Cadillac.....	T	950	T. C.	4	10	10	1	5	5	Sep.	J. S.	Cell
Cadillac.....	30	1400	T. C.-R. & S. T.	5, 3, 4	25	30	4	4	4 1/2	Sep.	J. S.	Cell & Bat.
Chalmers-Detroit.....	30	1500	T. C.	5	24	24	4	3 1/2	4 1/2	En Bloc.	J. S.	Bat.
Chalmers-Detroit.....	30	1500	Runabout.	2, 3, 4	24	24	4	3 1/2	4 1/2	En Bloc.	J. S.	Bat.
Chalmers-Detroit.....	30	2500	Limousine.	7	24	24	4	3 1/2	4 1/2	En Bloc.	J. S.	Bat.
Chalmers-Detroit.....	40	2750	T. C.	5	40	40	4	5	4 1/2	In pairs.	J. S.	Bat.
Chalmers-Detroit.....	40	2750	Runabout.	2, 3, 4	40	40	4	5	4 1/2	In pairs.	J. S.	Bat.
Corbin.....	K-2 or R-2	2500	T. C.	5	32	32	4	4 1/2	4 1/2	Sep.	J. S.	Cell & Bat.
Corbin.....	O-2 or S-2	2500	Runabout.	2, 3, 4	32	32	4	4 1/2	4 1/2	Sep.	J. S.	Cell & Bat.
Corbin.....	O-2 or S-2	2650	Small Tonneau	4	32	32	4	4 1/2	4 1/2	Sep.	J. S.	Cell & Bat.
Corbin.....	14	3500	Limousine.	5 or 7	32	32	4	4 1/2	4 1/2	Sep.	J. S.	Cell & Bat.
Elec. V. Co.....	48 Lot 3...	2750	T. C.	5	29	29	4	4 1/2	4 1/2	In pairs.	Make & Break	Low Ten. Mag.
Elec. V. Co.....	48 Lot 3...	3750	Limousine.	7	29	29	4	4 1/2	4 1/2	In pairs.	Make & Break	Low Ten. Mag.
Elmore.....	44	2500	T. C.	5	24	35	4	4 1/2	4	Sep.	J. S.	Cell & Gen.
Elmore.....	33	1750	T. C.	5	24	24	3	4 1/2	4	Sep.	J. S.	Cell & Gen.
Elmore.....	33	2250	Landaulet.	5	24	24	3	4 1/2	4	Sep.	J. S.	Cell & Gen.
Elmore.....	33	1750	Roadster.	3 or 4	24	24	3	4 1/2	4	Sep.	J. S.	Cell & Gen.
E. M. F.....	30	1250	T. C.	5	25	30	4	4	4 1/2	In pairs.	J. S.	Bat. & H. T. M.
E. M. F.....	30	1250	Tourabout.	4	25	30	4	4	4 1/2	In pairs.	J. S.	Bat. & H. T. M.
E. M. F.....	30	1250	Small Tonneau.	4	25	30	4	4	4 1/2	In pairs.	J. S.	Bat. & H. T. M.
E. M. F.....	30	1250	Roadster.	3	25	30	4	4	4 1/2	In pairs.	J. S.	Bat. & H. T. M.
Franklin.....	G	1850	Touring Car.	4	18	18	4	3 1/2	4	Sep.	J. S.	H. T. M.
Franklin.....	D	2800	T. C.	5	28	28	4	4 1/2	4	Sep.	J. S.	H. T. M.
Franklin.....	H	3750	T. C.	7	43	42	6	4 1/2	4	Sep.	J. S.	H. T. M.
Haynes.....	XI	2900	Runabout.	3	36	36	4	4 1/2	5	In pairs.	J. S.	Bat. & H. T. M.
Haynes.....	X	3000	T. C.	5 or 7	36	36	4	4 1/2	5	In pairs.	J. S.	Bat. & H. T. M.
Knox.....	O	2900	Runabout.	4	38	38	4	4 1/2	4 1/2	Sep.	J. S.	Cell & H. T. M.
Knox.....	O	2950	Small Tonneau.	4	38	38	4	4 1/2	4 1/2	Sep.	J. S.	Cell & H. T. M.
Knox.....	O	\$3000	T. C.	5	38	38	4	4 1/2	4 1/2	Sep.	J. S.	Cell & H. T. M.
Knox.....	M	5000	T. C.	7	48	48	4	5 1/2	5 1/2	Sep.	J. S.	Cell & H. T. M.
Locomobile.....	30	3500	T. C.	5	32	32	4	4 1/2	4 1/2	In pairs.	Make & Break.	Low Ten. Mag.
Locomobile.....	30	3500	Runabout.	4	32	32	4	4 1/2	4 1/2	In pairs.	Make & Break.	Low Ten. Mag.
Locomobile.....	40	4500	T. C.	7	40	40	4	5	6	In pairs.	Make & Break.	Low Ten. Mag.
Locomobile.....	40	4500	Small Tonneau.	4	40	40	4	5	6	In pairs.	Make & Break.	Low Ten. Mag.
Locomobile.....	40	5900	Limousine.	7	40	40	4	5	6	In pairs.	Make & Break.	Low Ten. Mag.
Lozier.....	H	5000	T. C.	7	44	45	4	5 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Lozier.....	H	5000	Briardiff.	5	44	45	4	5 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Lozier.....	H	6000	Limousine.	7	44	45	4	5 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Lozier.....	I	6000	T. C.	7	51	50	6	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Matheson.....	E	4500	T. C.	7	40	40	4	5	6	Sep.	Make & Break.	Cell & H. T. M.
Packard.....	30	4200	T. C.	7	40	40	4	5	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Packard.....	30	4200	Cl'ac' C'pled B'dy	5	40	40	4	5	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Packard.....	30	5650	Landaulet.	7	40	40	4	5	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Packard.....	30	4200	Runabout.	3	40	30	4	5	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Packard.....	30	5550	Limousine.	7	40	30	4	5	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Packard.....	18	3200	Open Car.	5	26	18	4	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Packard.....	18	4400	Landaulet.	7	26	18	4	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Packard.....	18	4300	Limousine.	7	26	18	4	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Packard.....	18	3200	Runabout.	3	26	18	4	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Palmer & Singer.....	XXXII	2250	Runabout.	2	28	28	4	4 1/2	4 1/2	In pairs.	J. S.	H. T. M.
Palmer & Singer.....	XXXII	3500	Landaulet.	6	28	28	4	4 1/2	4 1/2	In pairs.	J. S.	H. T. M.
Palmer & Singer.....	LXII	3250	Runabout.	3	57	57	6	4 1/2	5 1/2	Sep.	J. S.	H. T. M.
Palmer & Singer.....	LXII	3500	Small Tonneau.	4	57	57	6	4 1/2	5 1/2	Sep.	J. S.	H. T. M.
Peerless.....	19	4300	T. C.	7	38	30	4	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Peerless.....	19	5500	Limousine.	7	38	30	4	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Peerless.....	19	5800	Landaulet.	7	38	30	4	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Peerless.....	19	4300	Cl'ac' C'pled TC	5	38	30	4	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Peerless.....	19	4300	Roadster.	3	38	30	4	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Peerless.....	25	6000	T. C.	7	57	50	6	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Peerless.....	25	7000	Limousine.	7	57	50	6	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Peerless.....	25	7200	Landaulet.	7	57	50	6	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Pierce Arrow.....	24 H. P.	3100	Runabout.	3	24	24	4	3 1/2	4 1/2	In pairs.	J. S.	Bat. & H. T. M.
Pierce Arrow.....	24 H. P.	3950	Landaulet.	5	24	24	4	3 1/2	4 1/2	In pairs.	J. S.	Bat. & H. T. M.
Pierce Arrow.....	36 H. P.	4650	Brougham	5	36	36	6	3 1/2	4 1/2	In pairs.	J. S.	Bat. & H. T. M.
Pierce Arrow.....	36 H. P.	4000	T. C.	5	36	36	6	3 1/2	4 1/2	In pairs.	J. S.	Bat. & H. T. M.
Pierce Arrow.....	40 H. P.	5400	Limousine.	7	40	40	4	5	5 1/2	Sep.	J. S.	Bat. & H. T. M.
Pierce Arrow.....	48 H. P.	4800	T. C.	4	48	48	6	4 1/2	4 1/2	In pairs.	J. S.	Bat. & H. T. M.
Pierce Arrow.....	48 H. P.	6200	Landaulet.	7	48	48	6	4 1/2	4 1/2	In pairs.	J. S.	Bat. & H. T. M.
Pierce Arrow.....	60 H. P.	6000	T. C.	7	60	60	6	5	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Pope-Hartford.....	S	2750	T. C.	5	30	30	4	4 1/2	5 1/2	In pairs.	J. S.	Cell & Bat.
Pope-Hartford.....	S	3000	T. C.	7	30	30	4	4 1/2	5 1/2	In pairs.	J. S.	Cell & Bat.
Pope-Hartford.....	S	2750	Small Tonneau.	4	30	30	4	4 1/2	5 1/2	In pairs.	J. S.	Cell & Bat.
Pope-Hartford.....	S	2815	Roadster.	5	30	30	4	4 1/2	5 1/2	In pairs.	J. S.	Cell & Bat.
Pope-Hartford.....	S	3750	Landaulet.	7	30	30	4	4 1/2	5 1/2	In pairs.	J. S.	Cell & Bat.
Pope-Toledo.....	XXI	4500	Runabout.	4	38	50	4	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Pope-Toledo.....	XXII	4500	T. C.	7	38	50	4	4 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Royal Tourist.....	X	3500	T. C.	7	42	42	4	5 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Royal Tourist.....	Y	3500	Cl'ac' C'pled T.C.	4	42	42	4	5 1/2	5 1/2	In pairs.	J. S.	Bat. & H. T. M.
Royal Tourist.....	M	4500	T. C.	7	48	48	4	5 1/2	6	In pairs.	J. S.	Bat. & H. T. M.
Royal Tourist.....	M	5700	Limousine.	7	48	48	4	5 1/2	6	In pairs.	J. S.	Bat. & H. T. M.



# at the Madison Garden Show

## Features on Cars in A. L. A. M. Show

Radiators	Lubrication	Clutch	Type of Transmission	No. of Forward Speeds	Drive	Brakes	Wheel Base	TIRES	
								Front	Rear
Vert. Tube.	Mech. Oil.	Cont. Band.	Selective.	3	Shaft.	Cont. & Exp.	119	34x4	34x4
Vert. Tube.	Mech. Oil.	Cont. Band.	Selective.	3	Shaft.	Cont. & Exp.	128	34x4	34x4
Vert. Tube.	Mech. Oil.	Cont. Band.	Selective.	3	Shaft.	Cont. & Exp.	119	34x4	34x4
Vert. Tube.	Mech. Oil.	Cont. Band.	Selective.	4	Chain.	Cont. & Exp.	105	34x3	34x4
Vert. Tube.	Mech. Oil.	Cont. Band.	Selective.	4	Chain.	Cont. & Exp.	119	34x4	34x4
Tubular Tube.	Mech. Oil.	Disk.	Planetary.	2	Single Chain.	Cont.	82	30x3	30x3
Vert. Tube.	Crank Case Pump.	Cone.	Selective.	3	Shaft.	Cont. & Exp.	106	32x3	32x3
Vert. Tube.	Crank Case Pump.	Multiple Disk.	Selective.	3	Shaft.	Cont. & Exp.	110	32x3	32x3
Vert. Tube.	Crank Case Pump.	Multiple Disk.	Selective.	3	Shaft.	Cont. & Exp.	110	32x3	32x3
Vert. Tube.	Crank Case Pump.	Multiple Disk.	Selective.	3	Shaft.	Cont. & Exp.	110	32x3	32x3
Vert. Tube.	Crank Case Pump.	Cone.	Selective.	3	Shaft.	Cont. & Exp.	112	34x4	34x4
Vert. Tube.	Crank Case Pump.	Cone.	Selective.	3	Shaft.	Cont. & Exp.	112	34x4	34x4
Honeycomb Tube.	Gear Pump.	Cone.	Selective.	3	Shaft.	Cont. & Exp.	108	34x3	34x4
Honeycomb Tube.	Gear Pump.	Cone.	Selective.	3	Shaft.	Cont. & Exp.	108	32x3	32x4
Honeycomb Tube.	Gear Pump.	Cone.	Selective.	3	Shaft.	Cont. & Exp.	108	32x3	32x4
Honeycomb Tube.	Gear Pump.	Cone.	Selective.	3	Shaft.	Cont. & Exp.	114	34x4	34x4
Cellular.	Crank Case Pump.	Cone.	Selective.	3	Shaft.	Cont. & Exp.	115	34x3	34x4
Cellular.	Crank Case Pump.	Cone.	Selective.	3	Shaft.	Cont. & Exp.	115	34x3	34x4
Honeycomb Tube.	Mech. Oil.	Exp. Ring.	Selective.	3	Shaft.	Cont. & Exp.	110	34x4	34x4
Honeycomb Tube.	Mech. Oil.	Exp. Ring.	Selective.	3	Shaft.	Cont. & Exp.	104	32x4	32x4
Honeycomb Tube.	Mech. Oil.	Exp. Ring.	Selective.	3	Shaft.	Cont. & Exp.	104	32x4	32x4
Honeycomb Tube.	Mech. Oil.	Exp. Ring.	Selective.	3	Shaft.	Cont. & Exp.	104	32x4	32x4
Vert. Tube.	Autom'c vac. feed.	Exp. Ring.	Selective.	3	Shaft.	Cont. & Exp.	106	32x3	32x3
Vert. Tube.	Autom'c vac. feed.	Exp. Ring.	Selective.	3	Shaft.	Cont. & Exp.	106	32x3	32x3
Vert. Tube.	Autom'c vac. feed.	Exp. Ring.	Selective.	3	Shaft.	Cont. & Exp.	106	32x3	32x3
Vert. Tube.	Autom'c vac. feed.	Exp. Ring.	Selective.	3	Shaft.	Cont. & Exp.	106	32x3	32x3
Vert. Tube.	Mech. Oil.	Multiple Disk.	Prog.	3	Shaft.	Cont.	91	32x3	32x3
Vert. Tube.	Mech. Oil.	Multiple Disk.	Selective.	3	Shaft.	Cont.	106	36x3	36x4
Vert. Tube.	Mech. Oil.	Multiple Disk.	Selective.	3	Shaft.	Cont.	127	36x4	36x4
Cellular.	Mech. Oil.	Cont. Band.	Selective.	3	Shaft.	Cont.	112	36x4	36x4
Cellular.	Mech. Oil.	Cont. Band.	Selective.	3	Shaft.	Cont.	112	36x4	36x4
Cellular.	Crank Case Pump.	Three-plate.	Selective.	3	Shaft.	Cont. & Exp.	102	34x4	34x4
Cellular.	Crank Case Pump.	Three-plate.	Selective.	3	Shaft.	Cont. & Exp.	114	34x4	34x4
Cellular.	Crank Case Pump.	Three-plate.	Selective.	3	Shaft.	Cont. & Exp.	114	34x4	34x4
Cellular.	Crank Case Pump.	Three-plate.	Selective.	4	Side Chain.	Cont. & Exp.	127	36x4	36x5
Cellular.	Mech. Oil.	Cone.	Selective.	4	Shaft.	Expanding.	120	34x4	34x4
Cellular.	Mech. Oil.	Cone.	Selective.	4	Shaft.	Expanding.	120	34x4	34x4
Cellular.	Mech. Oil.	Cone.	Selective.	4	Side Chain.	Cont. & Exp.	123	36x4	36x5
Cellular.	Mech. Oil.	Cone.	Selective.	4	Side Chain.	Cont. & Exp.	123	36x4	36x4
Cellular.	Mech. Oil.	Cone.	Selective.	4	Side Chain.	Cont. & Exp.	123	36x4	36x4
Honeycomb Tube.	Mech. Oil.	Multiple Disk.	Selective.	4	Shaft.	Cont. & Exp.	124	36x4	36x5
Honeycomb Tube.	Mech. Oil.	Multiple Disk.	Selective.	4	Shaft.	Cont. & Exp.	124	36x4	36x5
Honeycomb Tube.	Mech. Oil.	Multiple Disk.	Selective.	4	Shaft.	Cont. & Exp.	124	36x4	36x5
Honeycomb Tube.	Mech. Oil.	Multiple Disk.	Selective.	4	Shaft.	Cont. & Exp.	131	36x4	36x5
Honeycomb Tube.	Mech. Oil.	Multiple Disk.	Selective.	4	Side Chain.	Cont. & Exp.	128	36x4	36x5
Cellular.	2-plunger Pump.	Exp. Band.	Prog.	3	Shaft.	Cont. & Exp.	123	36x4	36x4
Cellular.	2-plunger Pump.	Exp. Band.	Prog.	3	Shaft.	Cont. & Exp.	123	36x4	36x4
Cellular.	2-plunger Pump.	Exp. Band.	Prog.	3	Shaft.	Cont. & Exp.	123	36x4	36x4
Cellular.	2-plunger Pump.	Exp. Band.	Prog.	3	Shaft.	Cont. & Exp.	108	36x3	36x4
Cellular.	2-plunger Pump.	Exp. Band.	Prog.	3	Shaft.	Cont. & Exp.	123	36x4	36x4
Cellular.	2-plunger Pump.	Exp. Band.	Prog.	3	Shaft.	Cont. & Exp.	112	36x4	36x4
Cellular.	2-plunger Pump.	Exp. Band.	Prog.	3	Shaft.	Cont. & Exp.	112	34x4	34x4
Cellular.	2-plunger Pump.	Exp. Band.	Prog.	3	Shaft.	Cont. & Exp.	112	34x4	34x4
Cellular.	2-plunger Pump.	Exp. Band.	Prog.	3	Shaft.	Cont. & Exp.	102	34x3	34x4
Honeycomb Tube.	Gear Pump, G. F.	Multiple Disk.	Selective.	4	Shaft.	Cont.	107	34x4	34x4
Honeycomb Tube.	Gear Pump, G. F.	Multiple Disk.	Selective.	4	Shaft.	Cont.	112	34x4	34x4
Honeycomb Tube.	Gear Pump, G. F.	Multiple Disk.	Selective.	4	Shaft.	Cont.	126	36x4	36x4
Honeycomb Tube.	Gear Pump, G. F.	Multiple Disk.	Selective.	4	Shaft.	Cont.	126	36x4	36x4
Tubular.	Mech. Oil.	Exp. Band.	Selective.	4	Shaft.	Cont. & Exp.	122	36x4	36x4
Tubular.	Mech. Oil.	Exp. Band.	Selective.	4	Shaft.	Cont. & Exp.	122	36x4	36x5
Tubular.	Mech. Oil.	Exp. Band.	Selective.	4	Shaft.	Cont. & Exp.	122	36x4	36x5
Tubular.	Mech. Oil.	Exp. Band.	Selective.	4	Shaft.	Cont. & Exp.	122	36x4	36x4
Tubular.	Mech. Oil.	Exp. Band.	Selective.	4	Shaft.	Cont. & Exp.	118	36x4	36x4
Tubular.	Mech. Oil.	Exp. Band.	Selective.	4	Shaft.	Cont. & Exp.	136	36x4	36x5
Tubular.	Mech. Oil.	Exp. Band.	Selective.	4	Shaft.	Cont. & Exp.	136	36x4	36x5
Tubular.	Mech. Oil.	Exp. Band.	Selective.	4	Shaft.	Cont. & Exp.	136	36x4	36x5
Cellular.	Gear Pump, G. F.	Cone.	Selective.	4	Shaft.	Cont. & Exp.	111	34x3	34x4
Cellular.	Gear Pump, G. F.	Cone.	Selective.	4	Shaft.	Cont. & Exp.	111	32x4	32x4
Cellular.	Gear Pump, G. F.	Cone.	Selective.	4	Shaft.	Cont. & Exp.	119	34x4	34x4
Cellular.	Gear Pump, G. F.	Cone.	Selective.	4	Shaft.	Cont. & Exp.	119	34x4	34x4
Cellular.	Gear Pump, G. F.	Cone.	Selective.	4	Shaft.	Cont. & Exp.	124	36x4	36x5
Cellular.	Gear Pump, G. F.	Cone.	Selective.	4	Shaft.	Cont. & Exp.	130	36x4	36x4
Cellular.	Gear Pump, G. F.	Cone.	Selective.	4	Shaft.	Cont. & Exp.	130	36x4	36x5
Cellular.	Gear Pump, G. F.	Cone.	Selective.	4	Shaft.	Cont. & Exp.	135	36x4	36x5
Planetic.	Mech. Oil.	Cone.	Selective.	3	Shaft.	Expanding.	114	34x4	34x4
Planetic.	Mech. Oil.	Cone.	Selective.	3	Shaft.	Expanding.	114	34x4	34x4
Planetic.	Mech. Oil.	Cone.	Selective.	3	Shaft.	Expanding.	114	34x4	34x4
Planetic.	Crank Case Pump.	Multiple Disk.	Selective.	4	Side Chain.	Cont.	115	36x4	36x4
Planetic.	Crank Case Pump.	Multiple Disk.	Selective.	4	Side Chain.	Cont.	126	36x4	36x4
Sq. t. h. C mb.	Cone.	Prog.	3	Shaft.	Cont. & Exp.	114	36x4	36x4	36x4
Sq. t. h. C mb.	Cone.	Prog.	3	Shaft.	Cont. & Exp.	118	34x4	34x4	34x4
Sq. t. h. C mb.	Cone.	Selective.	4	Shaft.	Cont. & Exp.	126	36x4	36x5	36x5
Sq. t. h. C mb.	Cone.	Selective.	4	Shaft.	Cont. & Exp.	126	36x4	36x5	36x5

YOU may have lubrication, ignition, cooling, good bearings, tires and other necessities, but if you haven't carburation there is not much doing. Within the last 12 months many makers have realized that several of their troubles in conjunction with their cars can be traced to poor carburation. The outcome has been a careful consideration of details by several makers. In Europe the quest of good carburation has been largely increased by the almost prohibitive prices of gasoline, a factor which has been a big dictator in the design of cars. In America the gasoline consumption has not been a factor of any consequence, until within the last year when a few makers have discovered that the faults of poor carburation, or too great gasoline consumption, have not been simply a waste of money and a loss of time, but rather injury to the general tone of the motor.

Many of the energies expended on carburation within the last 10 months have been to secure a greater supply of gasoline in proportion to air for low speeds, and the more harmonious regulation with every throttle variation. Some makers have aimed to accomplish this by interconnecting the throttle with the needle valve, so that with every opening of the throttle there is an increase of the opening in the nozzle. On the other hand, one maker has placed the control of the needle valve with the auxiliary air valve so that as the extra air valve opens more gasoline is admitted. A couple of manufacturers showing two-nozzle carbureters have designed them so that the second nozzle is automatically brought into operation through the opening of a spring-controlled poppet valve located in the mixing chamber of the second nozzle. No matter how it is accomplished the aim is the same, namely, to get a uniform mixture on sudden throttle changes.

In the Locomobile carbureter is an improvement in the waterjacket dome for the first time this year, and the company has added a second auxiliary air valve placed close to the regular air opening. This valve is a conical wire spring, the coils fitting closely together normally and preventing the passage of air. The valve comes into operation in advance of the regular auxiliary air valve, which connects direct with the mixing chamber. The special auxiliary, all of the air through which passes the nozzle, is designed to improve the carburation on low speeds and heavy service, whereas the adjustments of the regular auxiliary air valve, the air through which does not pass the spraying nozzle, is to take care of high speeds and prevent an over-rich mixture.

# Specifications of the Cars

The simplification of the intake piping cannot be overlooked, and it is now possible, with a four-cylinder motor with twin castings, to use but 8 inches of piping, taking the form of a T with the cross joining the opposing ends of the valve housings on the twin castings. Short intake pipes avoid condensation and also give the advantage of quicker acting throttle control. The days of the compound Y for the four-cylinder motor have practically ended, and, in fact, it is no foolish leap of the imagination to foresee the day when with the cylinders cast en bloc the intake manifold will practically be eliminated, as far as the exterior is concerned, and will be confined to a core way within the casting. This is done now on several of the small motors and in the Chalmers-Detroit with en bloc cylinders one-half of the manifold is formed by the casting and the other half is a plate secured to the casting.

Many makers who consistently refuse to fit the pedal accelerator control in addition to the leverette on the steering column have at last been forced to acquiesce to demands of public opinion and have added the pedal. A praiseworthy improvement in connection with some of the accelerator pedals is the adoption of the lateral movement for opening the throttle instead of having to press down upon the pedal. This obviates the necessity of the tiresome operation of raising the toe of the foot, or holding it in a semi-raised position. With the lateral movement the foot always takes the least tiresome position. Controls on the steering wheels are nearly all of the stationary type, their position with reference to the driver not altering with each turn of the steering wheel.

In lubrication the great expenditure of energy has been in the role of simplifying and enclosing. The days of disfigured dashes are history. The dripping oilers and rows of ten or a dozen sight feeds extending one-quarter way across the dash are no more; but instead are one or two solitary vertical glass tubes which tell the story of the circulation of the oil. Sometimes these are placed in the center of the dash where they are anything but artistic, and in pleasing contrast to this is the method of a few makers to locate the single sight feed at one corner where it is scarcely noticeable, but equally visible to the driver. This is a year of plain dashes. The advent of the self-contained high-tension magneto has assisted in this work, as has the more or less general adoption of some form of crankcase-contained lubrication, with the result that many of the dashes carry nothing but one or two sight feeds and a switch. In time the switch will soon be removed, as will the sight feed, after which the dash will become a part of the car beautiful.



NAME	MODEL	Price	BODY		H. P.	MOTOR				IGNITION			
			Type	No. of Seats		A.L.A.M.	Other	No. Cyl.	Bore	Stroke	How Cast	Kind	Source
Selden	29	2000	T. C.	5	29	29	4	4	4	4	In pairs	J. S.	Bat.
Selden	29	2000	Roadster	3 or 4	29	29	4	4	4	4	In pairs	J. S.	Bat.
Selden	29	3000	Limousine	6	29	29	4	4	4	4	In pairs	J. S.	Bat.
Simplex		5750	Speed Car	5	53	53	4	5	5	5	In pairs	J. S.	H. T. M.
Simplex		5750	Small Tonneau	5	53	53	4	5	5	5	In pairs	J. S.	H. T. M.
Simplex		5750	T. C.	7	53	53	4	5	5	5	In pairs	J. S.	H. T. M.
Simplex		6750	Landaulet	7	53	53	4	5	5	5	In pairs	J. S.	H. T. M.
Stearns	15-30	3800	Landaulet	5	32	32	4	4	4	4	En Bloc	J. S.	Cell & H. T. M.
Stearns	30-60	4600	Small Tonneau	4	46	46	4	5	5	5	In pairs	J. S.	Cell & H. T. M.
Stearns	30-60	4600	Standard T. C.	5 or 7	46	46	4	5	5	5	In pairs	J. S.	Cell & H. T. M.
Stearns	30-60	4700	Pullman	7	46	46	4	5	5	5	In pairs	J. S.	Cell & H. T. M.
Stearns	30-60	5750	Limousine	5	46	46	4	5	5	5	In pairs	J. S.	Cell & H. T. M.
Stevens-Duryea	XXX	2850	Runabout	3	36	24	4	4	4	4	In pairs	J. S.	Cell & H. T. M.
Stevens-Duryea	X	3750	Limousine	5	36	24	4	4	4	4	In pairs	J. S.	Cell & Bat.
Stevens-Duryea	X	2750	T. C.	5	36	24	4	4	4	4	In pairs	J. S.	Cell & Bat.
Stevens-Duryea	U. Light Six	3500	T. C.	5	36	35	6	3	4	4	Sep.	J. S.	Cell & Bat.
Stevens-Duryea	Y 6-40	4000	T. C.	7	54	40	6	4	4	4	In pairs	J. S.	Bat. & H. T. M.
Studebaker	D		T. C.	5	36		4	4	4	4	In pairs	Make & Break	Low Ten. Mag.
Studebaker	C		T. C.	5	30	30	4	4	4	4	In pairs	Make & Break	Low Ten. Mag.
Thomas Flyer	6-70	6000	T. C.	7	72	72	6	5	5	5	Sep.	J. S.	H. T. M. & Spk. Gm.
Thomas Flyer	4-60	4500	T. C.	7	53	53	4	5	5	5	Sep.	J. S.	H. T. M. & Spk. Gm.
Thomas Flyer	4-60	6000	Limousine	7	53	53	4	5	5	5	Sep.	J. S.	H. T. M. & Spk. Gm.
Thomas Flyer	6-40	3000	T. C.	6	31	31	6	3	4	4	In 3's	J. S.	H. T. M. & Spk. Gm.
Thomas Flyer	6-40	3000	Flyabout	4	31	31	6	3	4	4	In 3's	J. S.	H. T. M. & Spk. Gm.
Thomas Flyer	6-40	4500	Limousine	6	31	31	6	3	4	4	In 3's	J. S.	H. T. M. & Spk. Gm.
Thomas Town Car		3000	Brougham	6	18	18	4	3	4	4	En Bloc	J. S.	High Ten. Mag.
Walter	M	5000	T. C.	7	48	48	4	5	5	5	In pairs	J. S.	Bat. & H. T. M.
Waltham	17	350	Buckboard	2	4	4	1	3	4	4	Sep.	J. S.	Cell.
White	O	2000	T. C.	5	20		2	*	3	3			
White	M	4000	T. C.	5	40		2	*	4	4			
Winton Six	17	3000	T. C.	5	48	48	6	4	5	5	In pairs	J. S.	Cell & H. T. M.
Winton Six	17	3000	Runabout	4	48	48	6	4	5	5	In pairs	J. S.	Cell & H. T. M.
Winton Six	17	4250	Limousine	5	48	48	6	4	5	5	In pairs	J. S.	Cell & H. T. M.
Winton Six	18	4500	T. C.	7	60	60	6	5	5	5	In pairs	J. S.	Cell & H. T. M.

\* Bore—High pressure 2½; low pressure 4½  
† Bore—High pressure 3½; low pressure 6

COMMERCE

Autocar	18	\$2225	Utility	1 Ton	18	2	4½	4½		H. T.	Cell
General Veh. Co.			Delivery	350 lbs	*	*	*	*			
General Veh. Co.			Delivery	½ Ton	*	*	*	*			
General Veh. Co.			Delivery	1 Ton	*	*	*	*			
General Veh. Co.			Truck	2 Ton	*	*	*	*			
General Veh. Co.			Truck	3½ Ton	*	*	*	*			
General Veh. Co.			Truck	5 Ton	*	*	*	*			
Hewitt		3000	Truck	2 Ton	24	2	5½	5		H. T.	
Hewitt		5000	Truck	5 Ton	28	4	4½	4		H. T.	
Knox	20	1400	Chassis	¾ Ton	12	1	5	8			Cell
Knox	18	4300	Chassis	5 Ton	50	4	5½	5½		H. T.	Cell
Packard		3850	Truck	3 Ton	32	4	4½	5½		L. T.	Cell
Pope-Hartford			Ambulance	30	30	4	4½	4½		H. T.	Bat.
Pope-Hartford			Police or fire	30	30	4	4½	5½		H. T.	Bat.
Sampson	4-9 A.	4500	Truck	4 Ton	40	4	5	5		H. T.	Cell
Studebaker	2007	2300	Delivery	1500 lb	†						
Studebaker		2500	Ambulance	1½ Ton	†						
Studebaker	2008	2700	Truck	1½ Ton	†						
Studebaker	2012	4500	Truck	5 Ton	†						

\* One motor, electric † Two motors

ELECTRIC

Make and Model	Price	BODY		Wheel base	No. Motors	BATTERY		Drive	Brake	Steering	TIRES	
		Type	Seating			No. Cells	Type				Front	Rear
Columbia	\$1,600	Phaeton	2	70	1	32	Exide	Chain	2	Wheel	30x3½	30x3½
Babcock		Roadster	3	92	1	42	Babcock	Chain		Wheel	32x3½	32x3½
Babcock		Town Car	4		1	42	Babcock	Chain		Wheel	32x4	32x4
Babcock	6	Phaeton	2	78	1	36	Babcock	Chain	3	Wheel	32x3½	32x3½
Babcock	1	Special	2	66	1	40	Babcock	Chain	3	Wheel	32x3	30x3
Babcock	10	Coupe	2	78	1	36	Babcock	Chain	3	Wheel	32x3½	32x3½
Babcock	7	Brougham	2	77	2	40	Babcock	Gear	3	Wheel	32x3½	30x3
Baker		Runabout	2	70	1	30	Exide	Chain	4	Wheel	32x3½	32x3½
Baker		Coupe	2	70	1	28	Exide	Chain	4	Lever	32x3½	32x3½
Baker	L	Victoria	2	70	1	24	Exide	Chain	4	Lever	30x3½	30x3
Baker	M	Roadster	3	95	1	40	Exide	Shaft	3	Wheel	34x4	34x4
Baker	I	Brougham	6	87	1	40	Exide	Shaft	4	Wheel	34x4	34x4
Studebaker		Coupe	2	67	1	24		Chain	2	Lever	30x3	30x3
Studebaker		Stanhope	2	73	1	36		Chain	2	Lever	30x4	30x4
Detroit	A	Victoria	2	74	1	24	Optional	Chain	2	Lever	32x3½	32x3½
Detroit	B	Victoria	2	74	1	24	Optional	Chain	2	Lever	32x3½	32x3½
Detroit	C	Coupe	2	74	1	24	Optional	Chain	2	Lever	32x3½	32x3½
Detroit	D	Brougham	4	74	1	24	Optional	Chain	2	Lever	32x3½	32x3½
Detroit	L	Roadster	2	87	1	16	Optional	Gears	2	Optional	32x3½	32x3½
Rauch & Lang	10	Stanhope	2	74	1	24	Exide	Chain	2	Lever	32x3½	32x3½
Rauch & Lang	10	Stanhope	3	74	1	24	Exide	Chain	2	Lever	32x3½	32x3½
Rauch & Lang	10	Coupe	2	74	1	24	Exide	Chain	2	Lever	32x3½	32x3½
Rauch & Lang	12	Stanhope	2	74	1	24	Exide	Chain	2	Lever	34x3½	34x3½



# at the Madison Garden Show

Radiator	Lubrication	Clutch	Type of Transmission	No. of Forward Speeds	Drive	Brake	Wheel Base	TIRES	
								Front	Rear
V zigzag tube		Cone	Selective	3	Shaft	Cont. & Exp.	114	34x3 1/2	34x4
V zigzag tube		Cone	Selective	3	Shaft	Cont. & Exp.	114	34x3 1/2	34x3 1/2
V zigzag tube		Cone	Selective	3	Shaft	Cont. & Exp.	114	34x3 1/2	34x4
Honeycomb		Multiple Disk	Selective	4	Side Chain	Cont. & Exp.	124	36x4	36x5
Honeycomb		Multiple Disk	Selective	4	Side Chain	Cont. & Exp.	127	36x4	36x5
Honeycomb		Multiple Disk	Selective	4	Side Chain	Cont. & Exp.	127	36x4	36x5
Cellular	Mech. Oiler	Exp. Band	Selective	4	Side Chain	Cont. & Exp.	121	36x4	36x4 1/2
Cellular	Mech. Oiler	Exp. Band	Selective	4	Side Chain	Cont. & Exp.	124	36x4	36x4 1/2
Cellular	Mech. Oiler	Exp. Band	Selective	4	Side Chain	Cont. & Exp.	121	36x4	36x5
Cellular	Mech. Oiler	Exp. Band	Selective	4	Side Chain	Cont. & Exp.	121	36x4	36x5
Cellular	Mech. Oiler	Multiple Disk	Prog.	3	Shaft	Cont. & Exp.	109	36x3 1/2	36x4
Cellular	Mech. Oiler	Multiple Disk	Prog.	3	Shaft	Cont. & Exp.	124	34x4	34x4
Cellular	Mech. Oiler	Multiple Disk	Prog.	3	Shaft	Cont. & Exp.	124	34x4	34x4
Cellular	Mech. Oiler	Multiple Disk	Prog.	3	Shaft	Cont. & Exp.	114	34x4	34x4
Cellular	Mech. Oiler	Multiple Disk	Prog.	3	Shaft	Cont. & Exp.	142	36x4	36x5
Cellular	Mech. Oiler	Cone	Selective	4	Shaft	Int.	117 1/2	36x4	36x4 1/2
Cellular	Mech. Oiler	Cone	Prog.	3	Shaft	Int.	104	34x4	34x4
Cellular	Mech. Oiler	Three Disk	Selective	4	Side Chain	Cont. & Exp.	140	36x4 1/2	36x5
Honeycomb	Mech. Oiler	Three Disk	Selective	4	Side Chain	Cont. & Exp.	127	36x4	36x5
Honeycomb	Mech. Oiler	Three Disk	Selective	4	Side Chain	Cont. & Exp.	127	36x4	36x5
Honeycomb	Mech. Oiler	Three Disk	Selective	3	Shaft	Cont. & Exp.	122	36x3 1/2	36x4
Honeycomb	Mech. Oiler	Three Disk	Selective	3	Shaft	Cont. & Exp.	122	36x3 1/2	36x4
Honeycomb	Mech. Oiler	Three Disk	Selective	3	Shaft	Cont. & Exp.	122	36x3 1/2	36x4
Tubular	Mech. Oiler	Three Disk	Selective	3	Shaft	Cont. & Exp.	103	32x4	32x4
Honeycomb		Cone	Selective	4	Shaft	Expanding	122	36x4	36x5
			Friction	5	Side Chain	Cont.	84	26x2 1/2	26x2 1/2
							104	32x3 1/2	32x3 1/2
							122	36x4	36x5
Vertical Tube		Multiple Disk	Selective	3	Shaft	Cont. & Exp.	120	34x4	34x4 1/2
Vertical Tube		Multiple Disk	Selective	3	Shaft	Cont. & Exp.	120	34x4	34x4 1/2
Vertical Tube		Multiple Disk	Selective	3	Shaft	Cont. & Exp.	120	34x4	34x4 1/2
Vertical Tube		Multiple Disk	Selective	4	Shaft	Cont. & Exp.	130	36x4	36x4 1/2

## AL CARS

Tubular	Ring	Progressive	3	Shaft	3	85x97	32x3 1/2	32x3 1/2
				Chains				
				Chains				
				Chains				
				Chains				
Cellular	Cone	Planetary	2	Chains	3	109	34x4	34x3 1/2
Cellular	Cone	Planetary	2	Chains	3	138	36	36x5
Air		Planetary	2	Chains	4	85	32x3	36x3
Cellular	Multiple disk	Selective	3	Chains	4	154	36x3	36x4
Tubular	Exp. band	Progressive	3	Chains	4	144	4	4 dual
	Cone	Selective	3	Shaft	4	130	34x5	34x5
	Cone	Selective	3	Shaft	4	130	34x5	34x5
Tubular	Cone	Selective	4	Chains	3	134	36x4 1/2	42x3
				Chains		92	36x3	42x3
				Chains		92	36x3	42x3
				Chains		111	36x4	42x4
				Chains		126	36x7	36x4

## VEHICLES

Make and Model	Price	BODY		Motors	BATTERY		Drive	Brakes	Steering	TIRES	
		Type	Seat		No. Cells	Type				Front	Rear
Hauch & Lang	12	2,100 Stan. Fold Seat	3	74	1	24 Exide	Chain	2	Lever	34x3 1/2	34x3 1/2
Hauch & Lang	12	2,350 Single Coupe	2	74	1	24 Exide	Chain	2	Lever	34x3 1/2	34x3 1/2
Hauch & Lang	12	2,500 Ext. Coupe	4	74	1	24 Exide	Chain	2	Lever	34x3 1/2	34x3 1/2
Hauch & Lang	13	2,200 Victoria	4	82	1	24 Exide	Chain	2	Lever	32x3 1/2	34x3 1/2
Hauch & Lang	14	2,350 Victoria	4	82	1	24 Exide	Chain	2	Lever	32x4	32x4
Hauch & Lang	14	2,700 Ex. Coupe	4	82	1	24 Exide	Chain	2	Lever	32x4	32x4
Hauch & Lang	124	2,250 Stanhope	4	74	1	40 Exide	Chain	2	Lever	32x4	32x4
Hauch & Lang	124	2,300 Stan. Fold Seat	4	74	1	40 Exide	Chain	2	Lever	32x4	32x4
Hauch & Lang	124	2,550 Coupe	4	74	1	40 Exide	Chain	2	Lever	32x4	32x4
Hauch & Lang	124	2,700 Ext. Coupe	4	71	1	40 Exide	Chain	2	Lever	32x4	32x4
Hauch & Lang	124S	2,150 Stanhope	4	74	1	40 Exide	Chain	2	Lever	32x4	32x4
Hauch & Lang	124S	2,200 Stan. Fold Seat	4	74	1	40 Exide	Chain	2	Lever	32x4	32x4
Hauch & Lang	124S	2,450 Coupe	4	74	1	40 Exide	Chain	2	Lever	32x4	32x4
Hauch & Lang	124S	2,600 Ext. Coupe	4	74	1	40 Exide	Chain	2	Lever	32x4	32x4
Hauch & Lang	144	2,450 Victoria	4	82	1	40 Exide	Chain	2	Lever	34x4	34x4
Hauch & Lang	144	2,800 Ext. Coupe	4	82	1	40 Exide	Chain	2	Lever	34x4	34x4
Hauch & Lang	144S	2,350 Victoria	4	82	1	40 Exide	Chain	2	Lever	34x4	34x4
Hauch & Lang	144S	2,700 Victoria	4	82	1	40 Exide	Chain	2	Lever	34x4	34x4
Woods	214	2,100 Open Victoria	4	73 1/2	1	40 Exide	Chain	3	Lever	*	*
Woods	214 A	2,700 Comb.	4	73 1/2	1	40 Exide	Chain	3	Lever	30x3 1/2	34x3 1/2
Waverly	74	1,500 Stanhope	2	70	1	30 Exide	Ch-Gr	3	Lever	30x3	30x4
Waverly	75 C	2,150 Phaeton Victoria	4	65	1	30 Exide	Ch-Gr	3	Lever	30x4	30x4

\* Solids, 30x2 1/2, pneumatics, 30x3 1/2

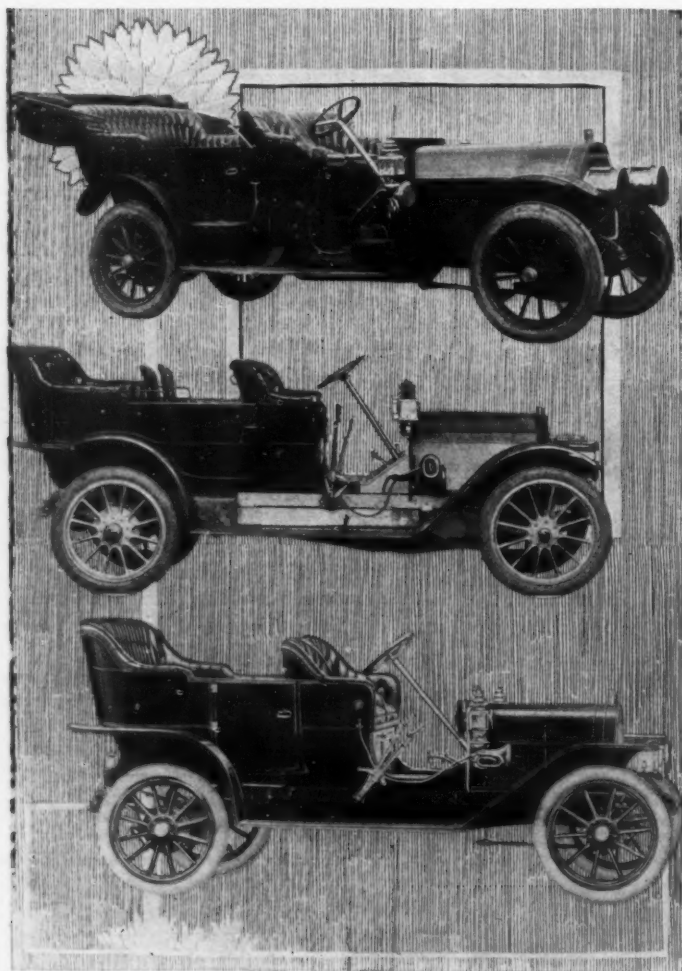
The fever of cleaning the running boards has not yet come, but it is almost due and before next year the spare tire on the running board, or in the rear of the tonneau, will have found another abiding place. Makers are beginning to realize the folly of a beautiful body contour and finish, coupled with disfigurements caused by loading gas tanks, tire tanks, tires, tool boxes, and battery boxes on the running board, until the car looks like a weighted down prairie schooner. A few months of progress in the economy of body design will result in the motor car coach work becoming as conservative of space as is the Pullman railroad car, and it is safe to predict that the exterior will be as bereft of encumbrances.

The status of the flywheel clutch gives indication of slowly swaying towards the multiple-disk type, in that several of the new models of town cars, taxicabs, and small cars, which makers are bringing out in addition to their regular line, are fitted with this type of clutch. An example of this is the Stearns town car, supplied with a Hele-Shaw clutch, whereas all the Stearns cars up to the present have been fitted with the expanding band type. It has been argued, however, that in view of the cheap price at which town cars must sell, that the disk clutch is prohibitive, and that the cone, or other simpler forms, would supersede it in these lines. Facts have proven the contrary, however, and the explanation seems to be in the fact that it is harder to abuse a town car, or taxicab, fitted with a disk clutch operating in oil, than it is with a cone clutch. The great tendency of drivers of these vehicles is to drop the clutch in as suddenly as possible, and, as these vehicles are constantly operating in zones of congested traffic, the amount of injury that can be done to the chassis parts of a car by frequent repetitions of this is great. The flat disk is holding its own, there not being that tendency towards the corrugated and conoidal types that was looked for a year ago. This is partly answered by patent privileges held by certain manufacturers. The policy of carrying the clutch in a separate compartment in the gearbox is gaining in favor among the makers.

The front and rear axle location has not yet come to its own, but the long-distance glasses of a few designers have been focused upon it for some time and developments may be looked for in the near future. It is becoming a practice to lengthen the wheelbase and actually shorten the body, the additional room being consumed by carrying the front axle forward so that it is in the same vertical plane of the radiator or in advance of it. In harmony with this is the carrying of the rear axle backwards so that the tonneau seat is in advance of it.



**A**LTHOUGH motorists have talked standardization consistently for the last couple of years, a very careful analysis of the licensed cars shows that this Utopian condition is still far distant, although present in such form as bolts, and different sizes of threads for car parts; yet, throughout the great systems of the cars, diversity runs rampant, and prophecies of a year ago have been cast to the winds and designs and constructions started along quite entirely different channels. From week to week during the past autumn, when announcements of 1909 cars have been made, the impression gained considerable headway that few changes were made in the majority of the cars, but when minute examination of them is made it is found that there are a score or more of changes of one nature or another in a great number of them. Where these changes will lead to it is impossible to answer, but a few streamers are appearing in the eastern sky, which, to a certain extent, foretell the conditions of the coming noonday, and it is becoming gradually possible to follow at least the direction of tendencies in spite of the multitudinous varieties of constructions which beset it.

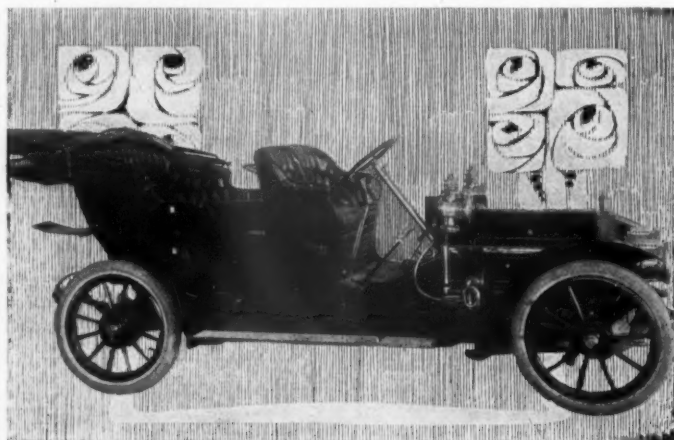


STEARNS SIX-CYLINDER

STUDEBAKER TOURING CAR

CADILLAC THIRTY

Human kind is runabout at the beginning, never direct. If the first motor car built had been formed a perfect machine, one maker would have had a universal monopoly, but not so. The first was intricate, complex, and indirect; so was the second; so are thousands of those that have been built since, and even today many use exceedingly round-the-bush designs, where more harmonious and simple constructions could be effected. But all these are converging towards the one goal, and, when the machinery of a motor car can be cased up as are the works of a watch, requiring attention not more than once or twice a year,



PIERCE-ARROW, 6-36 MODEL

if properly handled, it can then safely be said that perfection is attained as much as it is possible to attain it.

The difficulty of clearly defining the great lines of progress can be illustrated from the motor point of view. Many makers asserted 2 years ago, that the four-cylinder motor with opposite valves and twin castings was all that could be desired. But the makers are not stopping here. The six is persistently fighting its way into recognition, and now counts in its ranks such names as Winton, Stevens-Duryea, Pierce, Franklin, Thomas, Peerless, Apperson, Lozier, Matheson, Stearns, Palmer & Singer, and others, and from what these makers say concerning the demands of fastidious buyers it looks as though the six has established a permanent niche for itself in the great motor market that is found in the United States.

#### Problem of Valves in Head

To go a step further in the motor diversity quest, there is the problem of valves in the head. Although used on racing cars for 3 years and acknowledged superior to valves in offset chambers, the public had come to believe that while well-suited for speed creations they were poorly adapted for touring cars; but, there are even indications that some unlooked-for David may yet smite the giant Goliath. Since the last show a couple of names have been added to the valve-in-the-head fraternity, and those who have pinned their faith to it previously still swear by it. One maker goes so far as to state that before designing a new style of motor of this type he conducted tests with T and L styles, but got considerably greater efficiency from the valve-in-the-head design. What the eventual outcome of this motor strife will be remains impossible to foretell. It is even an im-



# Department



possibility to forecast the place that four or more cylinders formed in one casting will occupy, in spite of the storms of criticism that have been hurled against it.

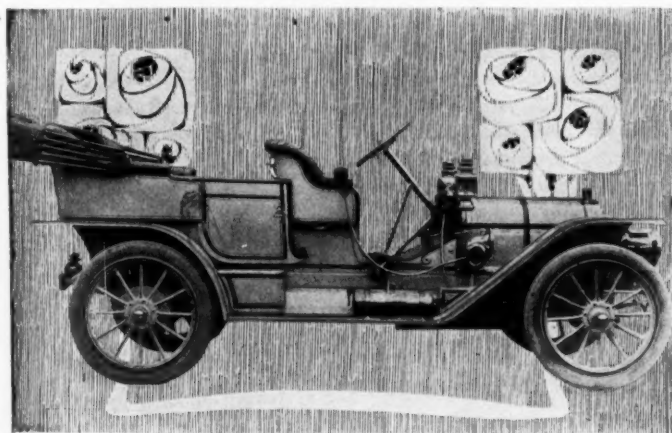
Reviewing the complete car a few leading tendencies are too *prima facie* to be misinterpreted. Of these attention is called to the selective gearset, which is now almost universal, and which has drawn to its ranks during the past year the Pierce company, which is fitting four-speed selective sets on all of its models. In the transmission line there has been a landslide towards incorporating the gearbox with the rear axle, and now lined up with

results in the elimination of the running board, and the lowering of the door, which is particularly valuable for town work.

To enumerate the diversities of ignition, cooling and lubrication would open a discussion requiring pages to even analyze. In oiling, as delineated on other pages of this issue, the great trend seems to be towards some form or other of crankcase-contained lubrication, and the circulation system looks a popular one. It is working very slowly and permits of the greatest variety and diversity of design. In solving the lubrication problem, the aim is not so much to reduce the quantity of oil consumed as to get it at the proper place, at the proper time, and in the proper quantity. Stringent laws are being passed against smoky exhausts and it behooves makers to give every attention to this important factor of the hydrocarbon motor.

## ALARM

**Locomobile**—The most important feature in regard to the Locomobile line for 1909 is the coming out of its 30-horsepower shaft-driven model L, a car which has occupied the designers for

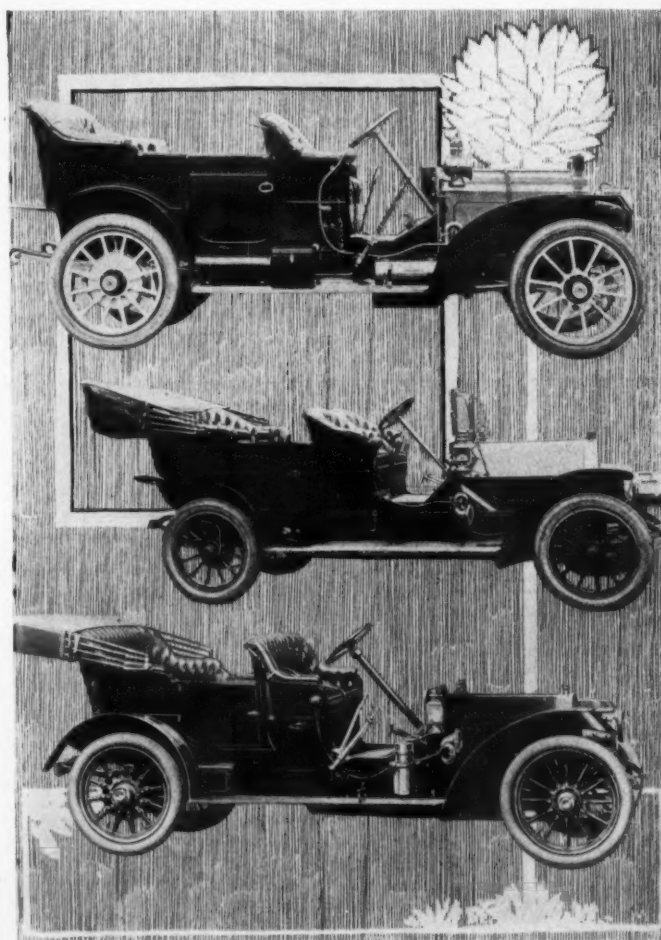


HAYNES 1909 TOURING CAR

the pioneer Packard in this construction are such concerns as Thomas, Stearns, Matheson and Everett-Metzger-Flanders, the majority of which use this construction on one model only. Shaft drive has worked its way several paces nearer the van, its progress being measured by the general adoption of it by the Lozier cars, its use on the now Matheson six, its employment on several of the Stearns models, the fitting of it to the Thomas little six, its introduction on the Locomobile Thirty, and its use on several Apperson models, all of these being concerns which 2 years ago built nothing but chain-driven machines.

### Three-Quarter Elliptic Springs

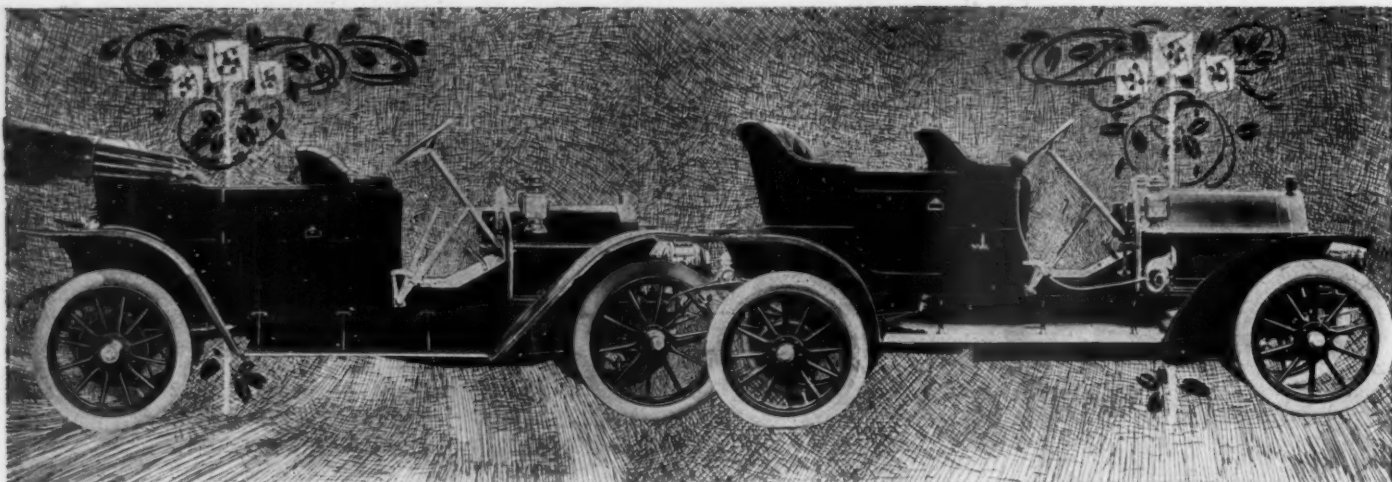
The three-quarter elliptic rear spring, about which so many messages came from Europe a year ago, has made a very rapid debut and has been taken up by such factories as Pierce, Thomas, Stearns, Matheson, Chalmers-Detroit, Palmer & Singer, and some others. Some of them fit it to all their models; others to their town cars, and others to some of the small types. The platform spring has been retained by its old admirers and has been adopted by one or two other concerns on their seven-passenger touring cars and heavy limousines; whereas, these concerns cling to the semi-elliptic in their lighter models. The semi-elliptic is supreme, in conjunction with the forward axle. The dropped frame, of which Peerless was the American pioneer, has received very general adoption and in conjunction with the arched style has resulted in a great improvement in lowering the suspension of the rear of the body. The advent of the taxicab has added fuel to the frame design craze and there is good promise of the double drop between the axles, such as is used on the Palmer & Singer town cab, which is illustrated on these pages. The double drop



PACKARD THIRTY TOURING CAR

KNOX MODEL M TOURING CAR

LOCOMOBILE THIRTY



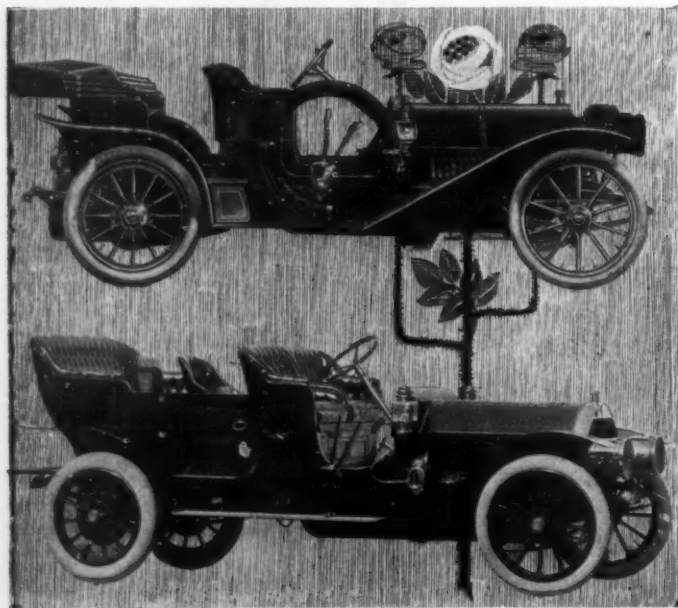
CHALMERS-DETROIT THIRTY

CHALMERS-DETROIT CLOSE-COUPLED CAR

the past 3 years, and which now enters the list, hand in hand with the 40-horsepower chain-driven car which remains practically unchanged. In the shaft-driven model, which is the first of its kind built by this company, nothing out of the ordinary appears in general design, but several combinations exist, by means of which the good features of the chain-driven car have been incorporated. In the motor, the cylinders of which are cast in pairs, and have a  $4\frac{1}{2}$ -inch bore and stroke, but few changes are apparent. The valves are located on opposite sides, camshafts are one-piece drop forgings with integral cams, and the intake shaft carries the igniter cams of the make-and-break mechanism, which have a taper face, so that by sliding the entire camshaft endwise, the spark may be advanced or retarded. The crankcase is of cast bronze with its lower removable portion of aluminum. The crankshaft is made from a solid forging of alloy steel and drilled to insure lubrication of the lower ends of the connecting rods, and is supported on white bronze bearings. The train of gears operating the valves, pump and ignition is enclosed and runs in oil. A waterjacketed carburetor of Locomobile design is fitted for the first time and new on it is the double auxiliary air valve, in one of which the admitted air passes the spraying nozzle. Ignition is make-and-break, and the iridium contact points employed are now welded to their blocks. The cooling system is comprised of a centrifugal pump, a honeycomb radiator, an adjustable belt-driven fan. Lubrication is by means of a mechanical oiler which forces the oil to the crankcase, bearings

and timing gears. The clutch is of the leather-faced cone type with springs under the clutch leather to facilitate smooth engagement. The gearset is of the selective type, four speeds forward and one reverse, with but two sliding members, and is equipped with annular ball bearings. The gearcase is of the same construction as the crankcase, manganese bronze with an aluminum oil pan. In the running gear, the frame is of pressed alloy steel, heat-treated, of channel section, raised above rear axle, and narrowed in front to reduce the turning radius. The front axle is of I-beam section, while the rear axle, of full floating type, consists of a steel housing, with heavy tapering steel tubes forced into openings on each side riveted into place and braced with an adjustable strut rod. Radius, or distance rods, similar to those on the chain-driven cars, maintain a parallelism between the front and rear axles, and as these rods carry the brakes, the rear axle is relieved of all driving and braking strains. The spring seats, as well as the axle end of the distance rods have a lubricated bearing and are free to turn on the axle; the torque all being taken up by a torsion rod firmly attached to the differential housing with its forward end held in a flexible joint attached to the cross members of the frame that supports the rear end of the gearcase. The rear springs have shackles at both ends, and their only duty is to carry the load. The dogs, or jaw clutches of the axle driveshafts are integral with the shafts, and imported annular ball bearings are used throughout the gearcase and driving mechanism. Both sets of brakes are on the rear axle are of the internal type, lying side by side and act on the rear wheel drums. The control is by means of bronze steering wheel with hard rubber grip and steering gear of the worm-and-gear type with tie rod behind front axle; spark and throttle on stationary quadrants over the steering wheel, foot accelerator to the left of the clutch pedal; clutch and service brake pedals and gear change and emergency brake levers to the right of the driver's seat. The 40-horsepower machine has practically the same general characteristics except that it is a chain-driven car, has larger dimensions where necessary and has its service brake on the jackshaft.

### PIERCE-ARROW



POPE-TOLEDO TOURABOUT, MODEL 21

PIERCE-ARROW TOURING CAR, 6-48 MODEL

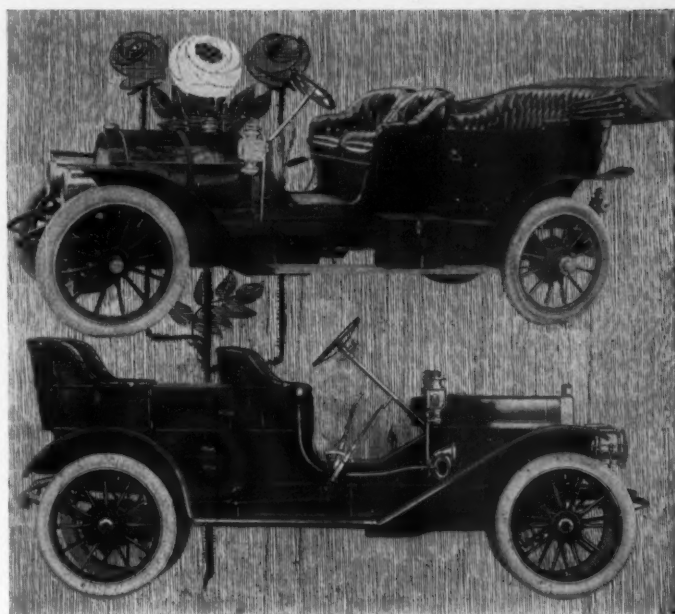
**Pierce-Arrow**—Never before has the Pierce company had such a variety of models as constitutes its line for 1909, and many radical changes have been made. In all four-24, six-36 and six-48-horsepower engines, cylinders are cast in pairs; four-40 and six-60-horsepower engines have separately-cast cylinders and have larger valves, while all sizes of engines have roller type of adjustable valve lifters, more gradual opening cams, fiber thrust bearings in front of crankshaft in place of balls, V-shaped fan belts; renewable fan pulley on fan hub; wider face on timing magneto and pump gears; oil pipe to valve gears, and magneto couplings of larger diameter; while four-24, six-36 and six-48-horsepower motors have a spring plunger on the commutator cover to more securely ground the current. As



regards changes in the transmission, all cars have selective type change speed gears with four forward speeds with direct on the fourth, and all the transmission cases have a flange on the high speed claw clutch and pinion to prevent grease leaking out. In the six-60-horsepower car, the square transmission shaft is made fluted in order to get more strength, and in the four-24 and six-36-horsepower cars a new type of universal joint is used at the rear end of the propellor shaft. In all cars the hand brake lever is pulled to apply brakes, and all brake shoes are lined with raybestos. In the four-40, six-48 and six-60-horsepower models, the steering wheel is 18 inches in diameter; four-24 and six-36-horsepower cars have a plain straight dash, and all cars have a wide brass flange on the dash to avoid scratching the paint when raising the hood. All strictly runabout models have greater slope to the steering column, radiator behind the axle, special sloping dished dash, and special body. Twenty-four and 36-horsepower models have three-quarter elliptic rear springs and rear brake shoes set at an angle on account of the drop frame. The Pierce-Arrow cars, then, for 1909 include two and three-passenger runabouts; two, three, four, five and seven-passenger touring cars; enclosed bodies of landaulet, landau, brougham and suburban types, with the following variety of chassis: four-24 and four-40-horsepower, and six-36, six-48 and six-60-horsepower, A. L. A. M. rating. In conjunction with the introduction of the selective gearset this year is the removal of the gear shifting lever from the steering column where the company has always placed it to the conventional location at the right end of the footboard. The new gearsets are carried throughout on annular ball bearings and have the gear-shifter parts entirely enclosed. The gearpump-gravity non-splash oiling system is retained, as are the transverse I beam motor-supporting arms and the semi-floating rear axle.



**Franklin**—The fundamental principles underlying the construction of the Franklin product, are fully maintained for the year of 1909. Six chassis are now on the market, including 18, 28 and 42-horsepower pleasure cars, a town car or taxicab and two commercial trucks. All are four-cylinder chassis, but the 42-horsepower one, which is a six. The 18-horsepower model G has automatic magneto control, progressive type transmission, semi-floating rear axle, 91½-inch wheelbase and 32-inch wheels. Model D is the same as G, except that it has a 24-horsepower motor, auxiliary magneto control lever on the steering wheel, 36-inch wheels and 106-inch wheelbase. Model H is practically the same as G, except that it has a six-cylinder motor, full floating rear axle, mahogany dash, worm steering gear, and 127-inch wheelbase. The model K-2 is for a town car or taxicab, and is the same as model G, except that it has a worm steering gear, and 100-inch wheelbase. The new features then with which one is impressed are: the Bosch high-tension magneto with its automatic governor, which is a single system, not being supplemented by a storage

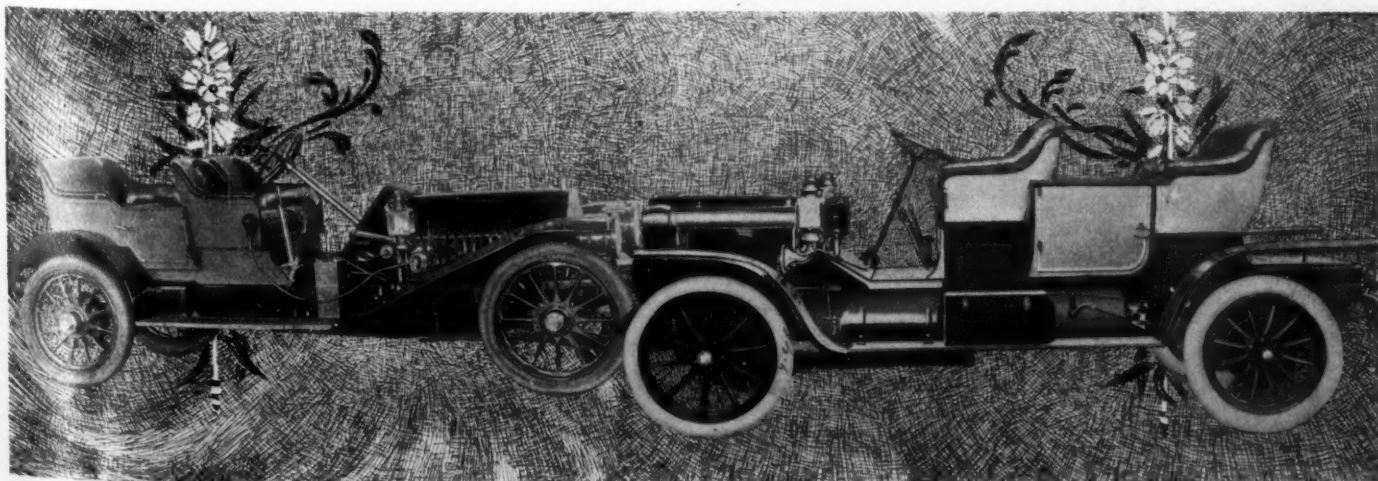


APPERSON, MODEL O, AS A TOURING CAR  
E-M-F, THE NEWCOMER, READY FOR ITS WORK

battery or dry cell set held in reserve—this is about the first example of single ignition system superseding the dual outfits, but is in keeping with the trend of many makers who exhibited at the recent Paris salon—the copper heat-radiating flanges on the cylinders, the clear dash and the increase in the size of the wheels and length of the wheelbase. The float of the carburetor has also been turned to the front so that there will be no want of gasoline at the spraying nozzle when climbing a hill. A one-piece dirt pan is fitted under the motor and transmission, which may be easily removed, and mudguards are placed between the runningboards, fenders and frame. There is also a mudguard in front of the motor, between the ends of the side members of the frame to prevent mud splashing through the screen onto the cylinders. Fenders are reinforced; universal joints are protected by rawhide boots; a hole is drilled in differential case to regulate the oil level and prevent oil from getting on brakes; brakes are improved, and steering rod joints are adjustable for wear and fitted with oil caps. The company again continues its wood frame and full-elliptic front and rear springs. These cars are featured because of their light weight.

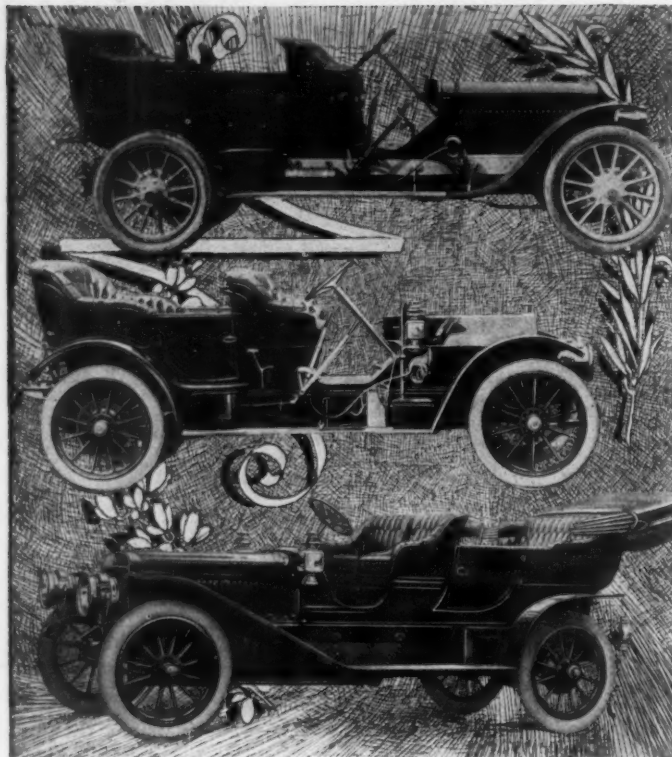


**Packard**—The Packard product consists of the Thirty, a development of the 1908 Thirty, and the new member—the Eighteen, an exact duplicate of the Thirty with the exception of 4½-inch cylinders with 5¼-inch stroke, 112-inch wheelbase, and a few



LOCOMOBILE THIRTY WITH TOY TONNEAU

WHITE STEAMER IN ITS 1909 DRESS



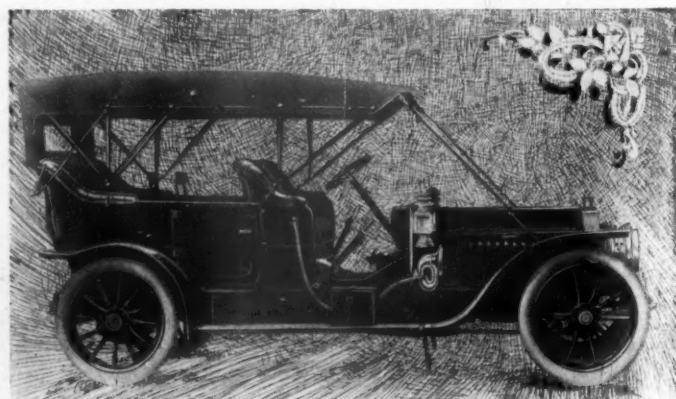
LOZIER SEVEN-PASSENGER MODEL  
ONE OF THE STEARNS GROUP, THE FOUR  
WINTON'S TOURING CAR

minor changes in technical dimensions to balance. The two chassis are equipped with the various types of modern body construction. In the Thirty there is a new system of camshaft drive gears, eliminating the idler. A primary intake shut-off has been provided on the carburetor for starting in cold weather; a cellular type radiator and a gear-driven centrifugal pump with a hydraulic pressure lubricated thrust bearing are improvements in water circulations. The reverse lever, used in connection with the transmission, has been eliminated and its duty assumed by the regular change-speed lever. The reverse is now obtained by a lateral movement into a recess of the fixed quadrant of the forward speed lever. The gasoline tank is provided with a means of retaining a reserve gasoline supply which is available by means of a convenient valve. The steering arm is now located above the axle, the brakes are larger and wider, the radius rods have been lowered and Timken roller bearings fitted in the front wheels. The crankcase is in three horizontal sections; the uppermost forming the base of the engine, and resting directly on the side members of the frame of the car. On each side, between the transverse supporting arms, is a horizontal, integrally-cast web, entirely enclosing the space between motor and frame. The crankshaft bearings are held between the upper and middle sections, which are webbed to obtain extreme rigidity. The bottom section is an oil well, easily removable for inspection or adjustment of connecting rods, camshafts, etc., without disturbing crankshaft bearings. The crankcase is further divided into front and rear compartments by a central partition which supports the middle crankshaft bearing. The carburetor is of Packard design and construction, with automatic auxiliary air inlet and water-jacketed mixing chamber. It uses the hydraulic governor control on the throttle. The ignition system is jump spark; current supplied by Eisemann low-tension magneto and imported Fulman storage battery. The lubrication is by splash from crankcase to all motor bearings. The clutch is of the expanding Packard type, and operated by the left pedal. The speed-changing set, bevel-gear final drive and differential gear are contained within a rigid aluminum housing, forming a real axle unit. Three speeds forward may be obtained by the use of the single-change-speed lever. All gears in transmission, final drive, differential and rear axle, run on imported annular ball bearings. The service brakes are

of the contracting band type, on rear wheel drums, and emergency brakes are expanding on rear wheel drums, and operated by lever. The steering gear is of the worm and sector type; worm and sector forged integral with their respective shafts. The frame is arched over the rear axle to provide increased spring action. Front axle is of steel tubing of large diameter, and heavy gauge, as are the stationary sleeves of the rear axle.

### ■ ALUM ■

**Peerless**—Among the many minor changes in the Peerless product of 1909, none are radical. The wheelbase has been lengthened  $3\frac{1}{2}$  inches, the radiator set back 1 inch, the hood made 1 inch longer, and the space between the dash and front seat increased  $1\frac{1}{2}$  inches. The oil reservoir is now cast integral with the crankcase on the left side and an improved type of water pump is used. The universal shaft between the clutch and transmission is simpler in its construction; all universal joints are larger and stronger, while those of the rear axle are of a new internal-external gear type. Many other small details in connection with the rear axle, clutch, fan and steering gear have also been improved. Two models are being built this year—a 30-horsepower four-cylinder and 50-horsepower six-cylinder, both chassis being fitted with touring car, roadster, landaulet or baby tonneau bodies and are alike in regard to mechanical designs. The cylinders, cast in pairs, with integral waterjackets and valve chambers and intake and exhaust valves on opposite sides, are bored, reamed and ground, and then lapped out with a special polishing preparation, with pistons and rings in place to secure compression. The crankcase is a single aluminum casting, divided into two compartments in the four-cylinder motor, and three in the six. Access to the connecting rods and bearings is through aluminum handhole plates at the bottom of the crankcase. The crankshaft is heat-treated and ground and supported on an annular ball bearing in front and special white bronze bearings in the middle and rear. All gears are housed in an oil-tight compartment of imported alloy valve steel, taper-seated and mechanically operated from camshafts contained within the crankcase. Lubrication is by splash with a mechanical oiler gear-driven and cast integral with the crankcase on the exhaust side of the motor. The oil is pumped through sight feeds on the dash to the compartments of the crankcase; an auxiliary hand pump is provided on the oiler for replenishing the supply in the crankcase; and standpipes are fitted with pet cocks underneath the car, which, when opened, determine the proper oil level in the compartments. A radiator of Peerless design, a herring-bone gear pump, and a gear-driven fan with a friction disk are features of the cooling system. The ignition system consists of a low-tension magneto with its induction coil on the dash, and the battery with vibrator coils in same case with magneto coil. Two sets of plugs are used, both on the intake sides, and the secondary wires are connected with spring contacts and enclosed and supported along the side of the motor in a neat and compact hard rubber case. The clutch is of the internal expanding band type used for years on these cars, and stops rotating as soon as disengaged, and a universal joint is provided between the clutch and transmission.



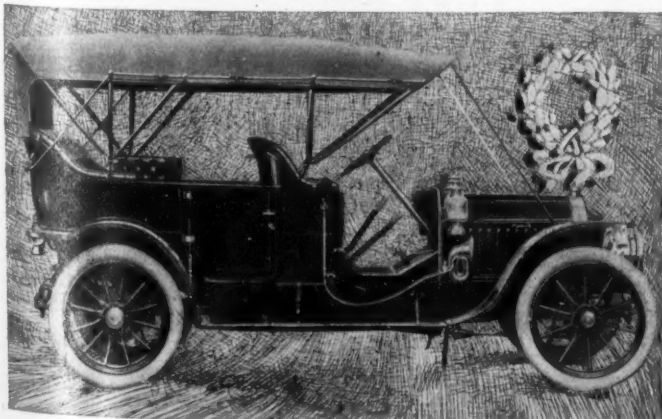
PEERLESS SIX-CYLINDER TOURING CAR



to take care of the contortions of the frame. The transmission is of the sliding gear, selective type, with four speeds forward. The driveshaft has two universal joints, and the rear axle, which is made of heavy-gauge steel tubes fitted into a cast steel differential case, is of the full floating type and cambered. The steering gear has the tie rod located behind the axle. The drop frame of cold rolled steel with sub-frame on which engine and transmission are carried is continued, as are springs made by Lemoine, of France, semi-elliptic in front and three-fourths platform in the rear. Brakes are expanding and contracting type.

### ■ PLAM ■

**White Steamer**—The principle changes made in 1909 White cars as compared with previous models are as follows: The valve motion has been redesigned, owing to the introduction of the Joy valve motion in place of the Stephenson. This new construction greatly simplifies the engine, and reduces the number of parts by about one-half. The Joy valve motion is actuated directly from the connecting rods. Centrally fulcrumed on each connecting rod at a short distance above the crankpin is a cross lever, one arm of which hinges the bottom of the rod carrying the piston valve and on the outer end of this arm is a roller which fits in a crescent-shaped slot in a bracket, which bracket can be tilted as desired. The position of this crescent piece determines the valve actuation and by rocking it the length of valve opening can be determined and the reversing of the motor accomplished. This is the complete system, one which is exceedingly simple and allows of other simple constructions in the motor. All eccentrics on the crankshaft are done away with and the cylinders are brought close together, permitting the use of a short one-piece crankshaft which is supported on two annular ball bearings. The water and air pumps are driven from the valve mechanism; and piston valves are used for both high and low-pressure cylinders. The engine is fitted for the first time with relief valves which allow the water to escape readily from the cylinders when starting cold. The exhaust pipe from the engine to the condenser is now so constructed that it serves as the feed water heater, thus saving weight and space. The oiler is now driven by a ratchet device from a rocker arm on the valve mechanism. The fanshaft bearing, instead of being rigidly held in place, is pivoted eccentrically and a spring bears against it in such a way as to keep the fan belt under tension. The course of the water circulation from the pump to the generator has been changed so that the water, after leaving the pump, goes to the flow-motor, then to the feed water and heater, and then to the generator. In this way, all the water passing through the feed water heater goes to the generator. The engine runs normally on "cutoff" as a "cutoff" pedal is provided for slow, hard pulling. The pilot light has been improved, and but two valves are now used to start "cold," instead of three as formerly, and it may be completely opened up for cleaning by removing three screws. The vaporizer is now a steel forging and owing to the closeness of the grain, the possible formation of carbon is almost eliminated. The drive from the motor to rear axle is now, except for the action of the rear



PEERLESS. FOUR-CYLINDER TOURING CAR



STUDEBAKER A-30 WITH BABY TONNEAU

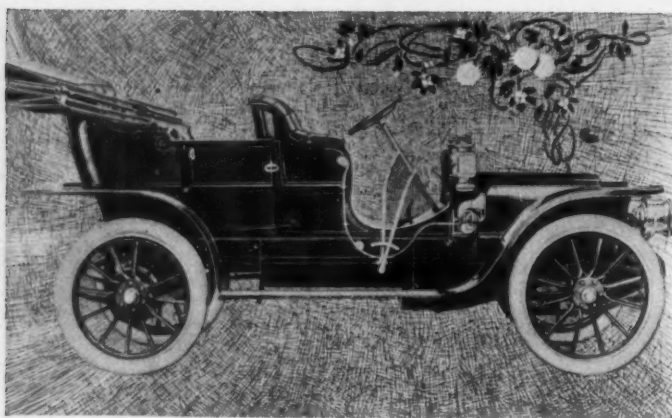
KNOX MODEL O IN ATTRACTIVE FORM

ROYAL SEVEN-PASSENGER RIG

springs, absolutely horizontal. The White company has greatly improved its facilities for drop forging, so that many minor parts which were formerly castings are now forgings. A special study of the heat treatment of their steels has also been made, and a splendid hardening plant with furnaces equipped with Englehard pyrometers, enables them to eliminate all guess-work from their hardening processes.

### ■ PLAM ■

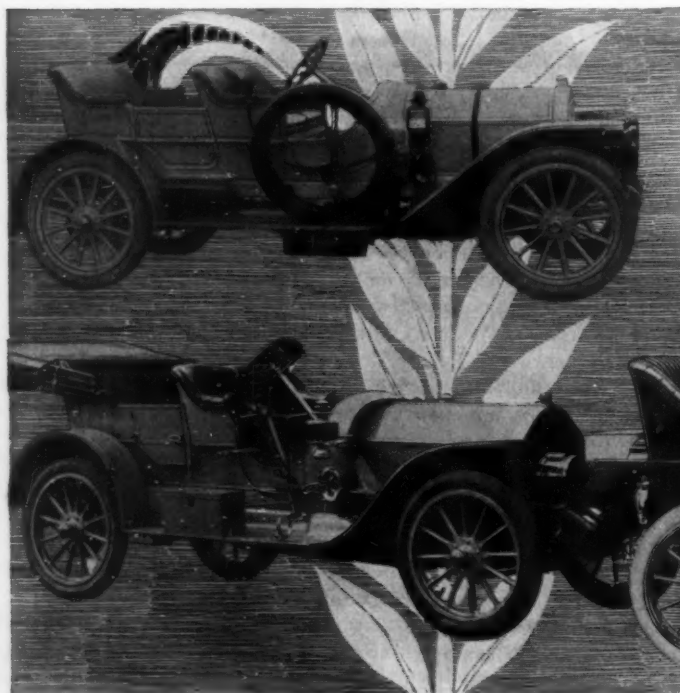
**Chalmers-Detroit**—The Chalmers-New-Detroit and Chalmers-Detroit-Forty, equipped with touring car, tourabout and roadster bodies, comprise the line of that company for 1909. The Forty is practically unchanged, except that elliptic springs, which are made of Vanadium steel, have been adopted for the rear; 5½ per cent nickel steel is used for propellershaft and driveshafts of the rear axle, and a new style battery box with a few improvements in the painting, trimming and finish are provided. The new Chalmers-Thirty is a combination of the accepted features of modern motor car construction assembled in a unique and practical manner. The motor, which is rated at 24 to 30 horsepower, is of the four-cylinder *en bloc* type, with integrally cast waterjackets and exhaust valve chambers. The intake valves are located in the center of the cylinder head and operated by means of rocker arms and push rods from the same camshaft that operates the exhaust valves which are located on the left side of the motor. The intake valves are extremely large in diameter and all valves are of the flat-seat type. The crankshaft, owing to the compactness of the motor is supported on but two two-point annular ball bearings and is 2½ inches in diameter. The crankcase is of aluminum with integrally cast housings for motor gears and flywheel with the lower portion containing the oil reservoir or sump, detachable for inspection of the motor, connecting-rod bearings, and divided into four compartments to insure an equal distribution of oil when climbing hills. This case, in connection with the transmission case which is bolted to it just back of the flywheel, completes the unit power plant. Lubrication is splash by means of the self-contained system, the oil, overflowing from the crankcase proper, and collecting in the reservoir at the bottom, being strained and lifted by a gear pump, through a sight feed



FRANKLIN TOURING CAR, MODEL D

on the dash and back into the crankcase. Double ignition is used with two sets of plugs, and a Bosch high-tension magneto and storage battery, coil and commutator, to furnish the jump spark. Cooling is effected by means of a vertical-tube McCord radiator, belt-driven fan and a centrifugal pump driven off the end of the camshaft and enclosed within the flywheel housing. An interesting feature is the intake manifold, which is cast integral with a large inspection plate, at the side of the motor, and thereby kept warm and preventing condensation of the mixture while en route to the cylinders. Another feature is the foot control to the carburetor which has a lateral movement, and enables the driver to rest his foot in a normal position on the footboard. The clutch is of the multiple-disk type, runs in oil, and is operated by a pedal which has its fulcrum on the transmission case, and serves two purposes. After disengaging the clutch, a further application of pressure on the pedal brings into action the contracting thermoid-lined band brakes on the rear end of the transmission case. The transmission is of the selective type with three forward speeds with shafts in the same vertical plane and supported on annular ball bearings. The propellershaft is incased in a steel tube, made fast to the differential case and which absorbs the driving and braking strains and takes the place of a torsion rod. The rear axle is of the floating type, and live axles and gears are made of  $3\frac{1}{2}$  per cent nickle, heat-treated

COLUMBIA MARK 48

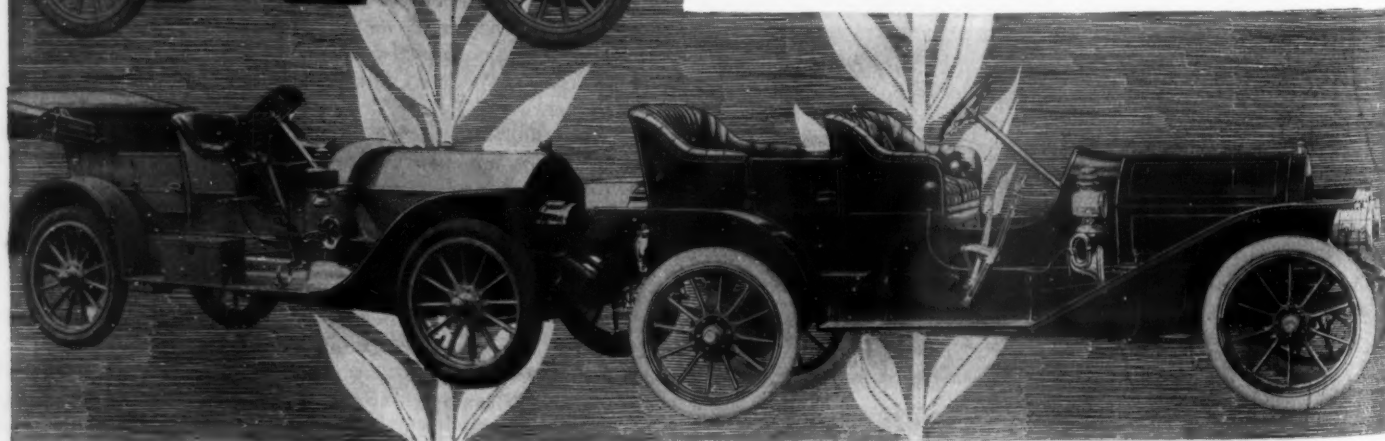


KNOX MODEL O, TOY TONNEAU

steel. The frame is pressed steel, channel section; springs are semi-elliptic front and three-fourth elliptic rear, with spherically swiveled seats which prevent twisting of springs when striking bumps. The steering gear is of the worm and gear type, and the steering spindles rest on a single ball of large diameter, and suitable bushings take care of the side thrust. The emergency brakes are of the expanding metal-to-metal type, acting on rear wheel drums. The body, motor and radiator are carried between the axles.

### PIAM

**Winton**—Although no radical changes have been made in the two six-cylinder cars, manufactured by the Winton company, many changes have been made toward their improvement. The twelve-feed mechanical oiler has been replaced by a double plunger pump, one pump drawing the oil from the crankcase to the reservoir through a strainer, and the other taking the oil from the reservoir and delivering it to a header which is connected to the main bearings, the cylinder being oiled by the splash. The double oil pump and air pump are driven by a single eccentric on the crankshaft, instead of by bevel gears from the camshaft. The magneto and water pump being now located on one shaft are driven from one gear, eliminating one gear in the front case, and all of these gears are now cut with spiral teeth. The construction of the pushrod mechanism for the valves, and the shape of the cams have been improved to reduce noise. The rack has been removed from the clutch to prevent the tendency to lock the clutch out while the motor is running, possibly preventing accident by the fact that gears might have been left engaged when not in the neutral position and also relieving the spring thrust of the clutch on the thrust collars. The claw for the starting crank extends inside of the crankcase to prevent accumulation of dirt, and the intake manifold has been changed in shape. In the air self-starting system, the supply for the tank is taken from cylinders No. 1 and No. 6 instead of from No. 1 alone, and the shutoff valve on the air starting tank is placed in combination with the air starter casting on the dashboard. Provision has been made for filling the tires from the air tank by connecting a rubber tube from the tire to dashboard. The distributor for the self-starter has been placed on the end of the camshaft instead of being driven therefrom by bevel gears. The propeller shaft is now made of nickel steel, as are also the rollers and pins, and the universal joint ends are drop forgings instead of steel castings. The wheel diameter has been reduced to 34 inches on the 48-horsepower model, and the form of the dash and body design have been slightly altered. The steering wheel has been enlarged, and has three spokes instead of four. The end plates for the transmission countershaft are now cast integral with the case; and the coupling between the motor and transmission has been changed to a square block on either one, with a split housing surrounding them. The truss rod under the rear axle has been increased in size; the subframe supporting the motor and trans-



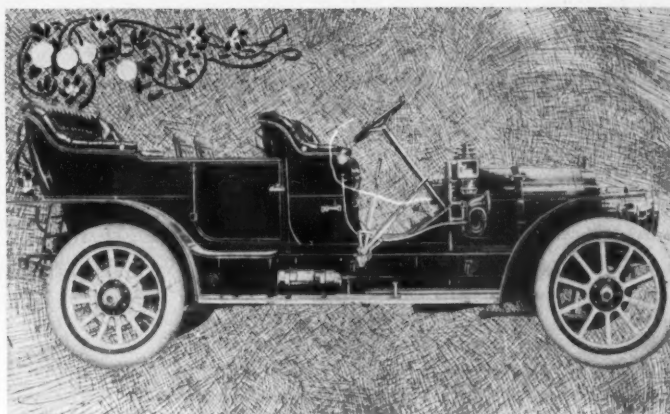
CADILLAC THIRTY TOY TONNEAU



mission has been increased in gauge of material, and nickel steel is used in the differential gears. The expanding brakes are now operated by direct pull on a rod connecting both inside wheel brakes, instead of passing through to equalizing yokes, which formerly extended across the frame at the spring brackets on the front end of the rear springs. The shutoff for the reserve gasoline supply in the main tank is now placed on top of the tank, and is operated by a special wrench carried in the tool box. The form of the mud guards has been altered to flat instead of curved; shock absorbers are added as standard equipment; and the spring leaves are nibbed instead of using a bolt.

### ■ APPERSON ■

**Apperson**—Although no radical changes have been made in the Apperson cars for 1909, a number of improvements are apparent, their efforts tending toward the standardization and refinement of those principles of advanced engineering practice, which the long experience of the Appersons has taught them to be most capable of and efficient in all kinds of motoring. Five chassis comprise the line for 1909 and include two four-cylinder shaft-drive chassis rated at 30 and 36 horsepower, one four-cylinder chain-drive chassis rated at 40-45 horsepower, one four-cylinder Jackrabbit chassis rated at 50-55 horsepower and one six-cylinder chain-drive chassis rated at 50-55 horsepower and one six-cylinder rated at 45 horsepower, shaft-driven. Model O, with a four-cylinder vertical type motor, has separate cylinders with integrally-cast heads, valve chambers and waterjackets, with intake and exhaust valves on opposite sides operated from camshafts located within the crankcase. The crankcase is of aluminum with the legs for supporting it on the frame, and the forward gear housing cast integral. The lower portion which holds the oil is detachable for the inspection of connecting rod and crankshaft bearings. The crankshaft is supported on five broad bearings in the upper portion of the crankcase. The camshafts can be withdrawn from the end of the motor without interfering with the rest of the motor, and valve lifters are adjustable. Cooling is by means of a vertical tube radiator, an eccentric pump driven off the intake camshaft, and a belt-driven fan and a fan flywheel. Lubrication is by splash in the crankcase and force feed from a mechanical oiler operated on a camshaft. Ignition is by jump spark with current supply from magneto and storage battery. The clutch is of the contracting band type, metal-to-metal, and has been used by the Apperson interests since 1895 without any changes whatever. A selective type transmission with three speeds forward and one reverse is housed in a one-piece aluminum case from which all gears and shafting can be removed by simply removing the cover. All gears are made of the best grade of imported Krupp chrome nickel steel. The universal joints of the driving shaft are of the latest type, thoroughly encased in an oil-tight housing, which is packed with grease, and when the car is loaded a straight line drive is practically obtained. The rear axle is of the floating type and so constructed that the rear wheels are cambered. Brakes are both on the rear wheel drums and of the internal and external



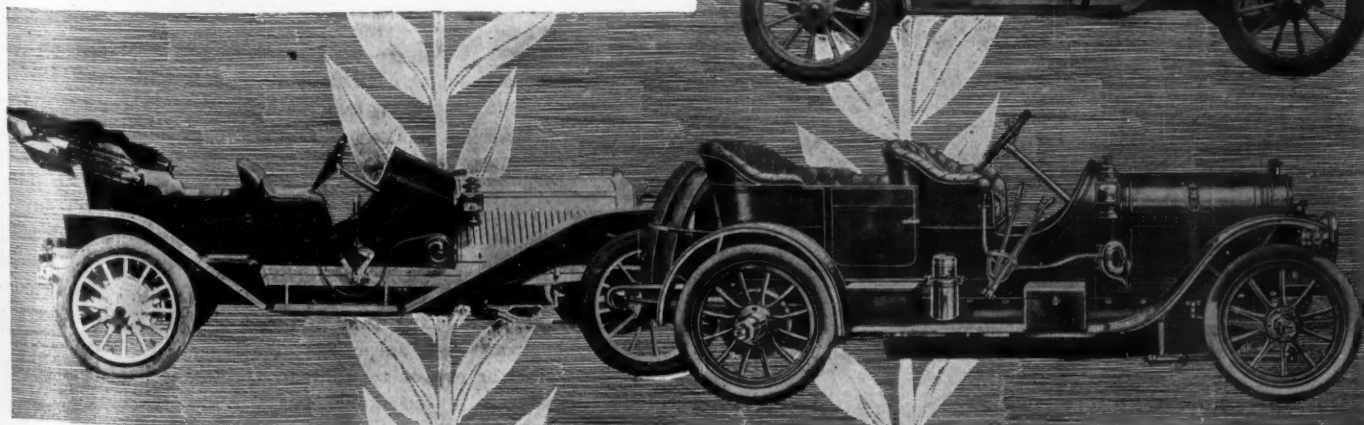
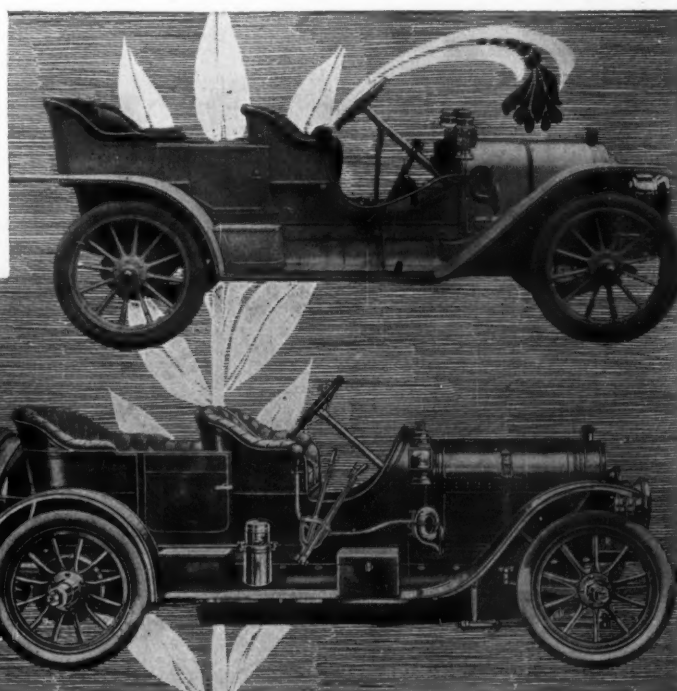
THOMAS FLYER, 4—60 MODEL

type. The front axle is drop forged from a special grade of Vanadium steel and the steering heads are mounted on ball bearings. The frame is of channel section; the steering gear is of the worm and sector type, and wheels are 34 inches in diameter and the wheelbase is 119 inches. The weight is 2,400 pounds. The model O is the lowest-priced car of the line and of the Apperson quality throughout.

### ■ CADILLAC ■

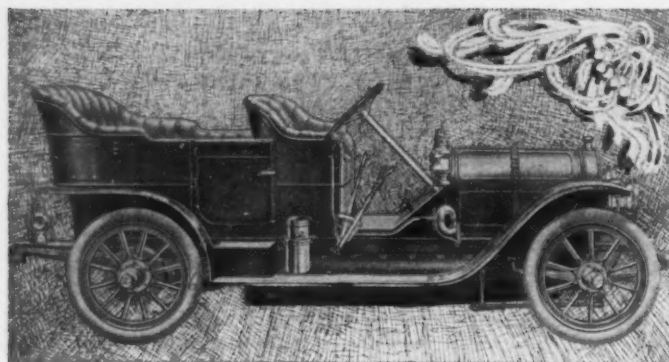
**Cadillac**—The Cadillac exhibit will consist of four complete cars—a chassis with parts of the motor, transmission, universal joint, steering gear, etc., cut away, operated by an electric motor, and a large assortment of finished parts. The Cadillac Thirty, the latest production of the company, will be shown with three types of bodies, namely, five-passenger touring car, four-passenger demi-tonneau, and three-passenger roadster with rumble seat. The Thirty has a four-cylinder, four-cycle motor with separately cast cylinders and copper waterjackets of the type used by this concern since its entry into the motor car field. The valves are all on one side and operated from one camshaft in the crankcase. A gear-driven pump, ball-bearing fan, and vertical tube and plate radiator are features of the cooling system. Lubrication is the splash system with mechanical feed. Jump spark ignition is used with a Bosch mag-

BABY TONNEAU HAYNES



LOZIER'S BRIARCLIFF MODEL

POPE-HARTFORD, WITH TOY TONNEAU

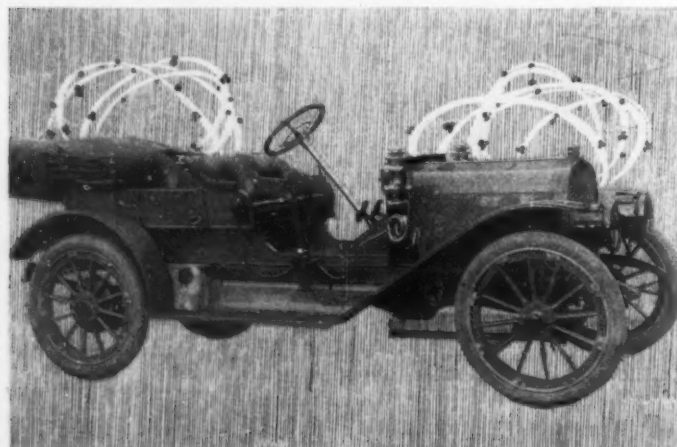


POPE-HARTFORD MODEL S IN TOURING FORM

reto and storage batteries. The clutch is of the leather-faced cone type with a special spring ring in the flywheel to effect easy starting. The transmission is of the selective type; the driveshaft has but one universal joint, and is enclosed in a steel tube. The universal joint is enclosed in a metal housing and runs in a bath of oil. When the car is normally loaded a straight-line drive is practically obtained from the motor to the rear axle. The rear axle is of the semi-floating type, equipped with ball and roller bearings. The front axle is made of seamless steel tubing with drop forged yokes and ball bearing wheels of the artillery type. The frame is pressed steel, dropped and narrowed. The spring suspension includes a three-quarter platform rear spring, the latter being provided with ball-joint shackles. Besides the four-cylinder cars, the Cadillac company is exhibiting for the seventh consecutive year, its 10-horsepower single-cylinder car which is made with several types of bodies, including runabout, touring car and coupe.

### ■ DIAM ■

**Lozier**—All the different models which the Lozier company is now turning out for 1909 are to be on exhibition, and in addition to the regular models which the company has been building for the past year will be shown for the first time the new little six light touring car. This is the lowest-priced model the Lozier company has ever built, and will be equipped with touring, toy tonneau, limousine or landaulet bodies. The noticeable features of the Lozier line this year is the entire abandonment of the chain-drive for that of the propeller shaft and floating rear axle. A continued feature is the almost universal use of annular ball bearings, these being found not only in wheels and all parts of the transmission, but practically every bearing in the motor, except the connecting rod bearings, is of this type; including the crankshaft, camshaft, clutch, pump and magneto drive, and fan mechanism. The little six, the new popular-priced car, is shown in chassis form ready for the body. The mechanical details and general characteristics of this car very closely resemble those of the large models with the exception of size and weight. The cylinders have



CORBIN AS A TOY TONNEAU CAR

3¼-inch bore by 4½-inch stroke, are cast in pairs, with integrally-cast heads, valve chambers and waterjackets, and have intake and exhaust valves all on left side. The fan, water pump and magneto also located on the left side of the motor, are all driven off of one shaft, by one gear located in the half-time gear housing. Lubrication in the motor is with the self-contained system and compression grease cups are fitted to all external bearings. The crankcase is of cast aluminum with detachable lower half and three large inspection plates on the right side of upper half. The wheelbase is 116 inches, and the weight complete with the touring body is 2,400 pounds. Double ignition system, employing Bosch high-tension magneto and Witherbee storage batteries, multiple-disk clutch of the same type as employed in the large cars, and a three-forward speed, selective type transmission are used. The other details then, are identical with those of the four-cylinder 45-horsepower car, which has practically become standardized. In this car, the cylinders of the vertical type, cast in pairs, with a bore and stroke of 5¼ inches, have large nickel steel valves on opposite sides, and are finished in baked enamel. The motor base of aluminum alloy completely fills in the space between side members of the frame, and the lower half is removable for the inspection of connecting rod bearings. Lubrication is by means of a four-feed, gear-driven mechanical oiler. The ignition systems are independent, two sets of plugs being used with Bosch high-tension magneto and Witherbee storage battery. The multiple disk clutch, employing thirty-three hardened and ground disks of saw blade steel, is contained in an oil-tight case within the flywheel. An automatic disk brake retards the rotary motion of the gearshaft to facilitate shifting of the gears. The gearset is of the selective type, four speeds forward, with direct drive on third speed. A feature of the shaft-driven mechanism is the use of but one universal joint, located just behind the gearcase. The torsion rod, as in the past year, has been eliminated, its duties assumed by an extension of the bevel gear housing in the form of a steel tubing which terminates at the forward end in a telescopic joint. The introduction of ball-and-socket joints for the terminals of the radius rods permits of the free movement of the rear axle in all directions. The drop frame, which is very deep in the middle section, tapers at the ends and special cross members support the cooler, transmission case and forward end of the shaft-drive member. Two sets of brakes are used, both on rear wheel drums. Internal brakes are metal-to-metal, while the external are lined with camel's hair. Platform springs are used in the rear and wheels are equipped with 36 by 4-inch front and 36 by 5-inch rear tires. The entire underbody of the car is protected from injury and road drift by a continuous casing of cast aluminum.

### ■ DIAM ■

**Knox**—The Knox line for 1909 consists of three models of chassis—model O, a 38-horsepower shaft-driven car; model M, a 48-horsepower chain-driven car, and model H, a 30-horsepower car with 4¾ bore and 4¾-inch stroke and air-cooled cylinders. With the exception of the cooling system, model H is of the same general construction as model O. These models are practically unchanged from those of last year, except that the wheelbase is increased; double ball bearings are provided in the transmission; a new three-plate disk clutch with cork inserts has been adopted, and changes have been made in the system of attaching the intake, exhaust and water manifolds that greatly simplifies removing the cylinder heads. The model O motor is of the four-cylinder, four-cycle type, water-cooled, with bore and stroke 4¾ and 4¾ inches respectively. The valves are in the head and all operated by means of rocker arms and push rods, from one camshaft on the right side of the motor. The crankcase is of a cast aluminum and of peculiar but simple construction, due to the fact that it forms the foundation for the unit power plant. It is suspended at three points, divided horizontally under the engine to allow access to the bearings, which are all contained in the upper half. The crankshaft of drop forged nickel steel is supported on five plain bearings. All crankshaft and connecting rod bearings are of Parson's white



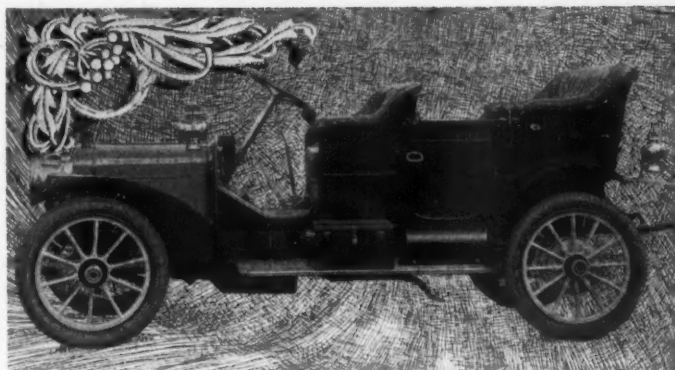
brass. Features of the cooling system are a self-adjusting, belt-driven fan, honeycomb radiator and gear-driven gear pump. Lubrication is direct force feed to the bearings by means of the crankcase self-contained system. Ignition is jump spark from a gear-driven, high-tension magneto and dry cells with Connecticut coil and timer. The gearset is of the selective type, three speeds forward and one reverse. A special feature is the straight line drive due to the power plant being inclined sufficiently to bring the crankshaft and drive shaft in a straight line, except for the slight action of the springs. The steering gear is of the screw and nut type, with the rod located behind the front axle. The springs are semi-elliptic all around with shackles on both ends of rear springs and no torsion rod is used, the driving strain being taken up by the radius rods. Thirty-four by 4-inch wheels are used, and brakes are of the external type, one acting on drum just behind transmission case, and other on rear wheel drums, and are faced with Raybestos. Control is by spark and throttle levers over the steering wheel, foot accelerator, clutch and service brake pedals and gear change and emergency brake levers at the right of the driver's seat. The model M chassis is the same as model O, except that the bore and stroke of the cylinders is  $5\frac{1}{2}$  inches; the motor is a unit in itself and suspended at three points; the transmission has four forward speeds; wheelbase is 127 inches, wheels are 36 inches with  $4\frac{1}{2}$ -inch and 5-inch tires and chain drive is used. Model H, with the air-cooled motor, has  $4\frac{3}{8}$ -inch by  $4\frac{1}{4}$ -inch bore and stroke, and is identical with model O, except for cooling system and its wheel base which is 102 inches.

### ■ PLAM ■

**Studebaker**—The line of Studebaker cars for 1909 include model D, 40-horsepower car, and model C, both in a variety of touring roadster designs and speed cars. One of the distinctive features of the Studebaker-Garford chassis is the absence of the conventional make-and-break ignition apparatus of previous years, and the adoption of the Simms-Bosch magnetic plugs in connection with the Bosch low-tension magneto in which plugs a make-and-break device is contained and which was described in Motor Age, issue of July 2, 1908, pages 30-31-32. The model D 40-horsepower car has a four-cylinder motor  $4\frac{3}{4}$ -inch bore by  $5\frac{1}{4}$ -inch stroke, with cylinders in pairs, integral waterjackets and opposite valves. The water system has been changed by having the water enter the valve chambers beneath the exhaust valves instead of above them, and a tubular radiator is fitted. The clutch of the leather-faced cone type has a new type of universal joint between it and the selective gearset with four speeds forward with direct drive on third speed. The drop frame is new and rests on half platform springs in the rear. The front axle is of I-beam section, while the floating rear axle is used. The brakes are of the expanding and contracting type, both on the rear wheel drums. The model C, with its 30 horsepower, uses the Bosch magneto plugs and is little changed since 1908. This chassis is now starting on its fifth season and has undergone few alterations since its inception. It uses the three-speed, gearset, non-floating rear axle and has two rear wheel brakes and a transmission brake. The Studebaker speed cars differ from the touring models by the longer dash and more rakish steering column.

### ■ PLAM ■

**Haynes**—The Haynes company is devoting its entire attention to the production of but one model for 1909. It is a development of the '08 model W. No radical changes have been made, but numerous improvements are apparent. The wheelbase has been increased from 106 inches to 112 inches, and the wheels have been increased to 36 inches in diameter. Brakes are both of the contracting band type, and located side by side on the rear wheel drums. The inner portion of the drums are enclosed to form reservoirs which may be filled with water for cooling the brakes when in strenuous service. The eye-and-bolt connections of the radius rods have been replaced with ball-and-socket joints, and steel wire cables with flexible anchors take the place of the leather rebound straps. The roller in the stay bar fork

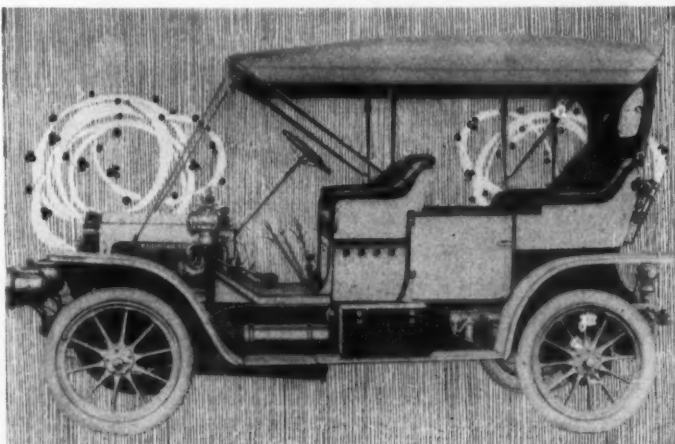


PACKARD EIGHTEEN

is enlarged, and more spring clearance is given to the rear end of the car. The side members of the frame have been reinforced with an extra channel section of a Vanadium steel, filled with wood, and braced with truss rods beneath, both reinforcements extending about three-fourths the length of the car. The clutch and transmission are unchanged except that a novel breaking device is fitted between the clutch and transmission, enabling the driver to shift the gears easily and without noise. Mud guards have been introduced between the fenders, running-boards and frame. The motor is practically the same as last year, except that Timken roller-bearings take the place of the plain end bearings, and a single-unit coil with high tension distributor is installed in the double ignition system. The two flywheels, one at the front and the other at the rear of the crankshaft, remain and the fan drives by belt from the front one, which is the lighter. The oiler remains as in '08, being incorporated in one front motor arm with the opposite motor arm used as an additional reservoir. The ratchet master gear on the countershaft of the gearset remains, so does the roller tooth pinion on the rear end of the propeller shaft, and the one-piece rear axle, which drives on wheel and has a sleeve for driving the other. A slight change has been made in the patented tension bar. Touring car, toy tonneau, runabout with single or double rumble seats, and Hiker bodies are fitted to this chassis.

### ■ PLAM ■

**Matheson**—While continuing its 1908 four-cylinder model with make-and-break ignition and fitting four-passenger roadster, baby tonneau, seven-passenger touring car, limousine, and landaulet bodies, the interesting feature is the new six-cylinder Matheson, which has been tried out for nearly a year and which is the outcome of considerable experimentation on the company's part. This new six embodies many features not previously incorporated in Matheson cars. To begin: It uses cylinders cast in pairs instead of the separate cast types. The camshaft is now located within the crankcase instead of over the cylinder heads, and although valves in the head are retained they are actuated



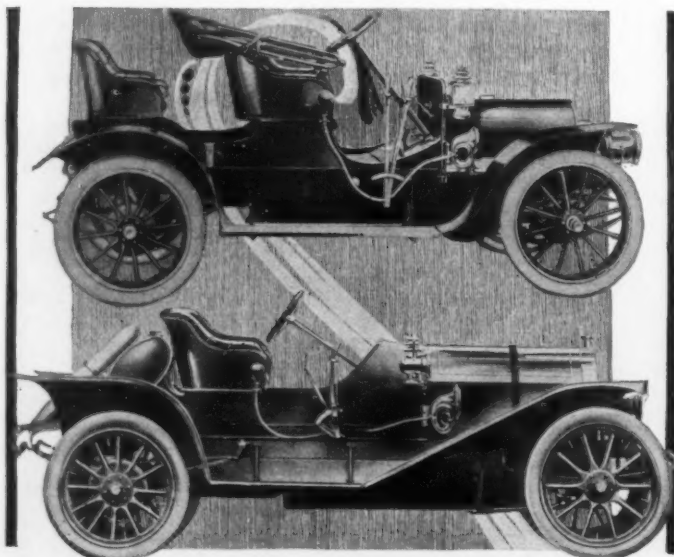
WHITE STEAMER 20-HORSEPOWER TOURING CAR

through lifter rods rising at the left side of the cylinders and hinging at their upper ends to valve rocker arms, the opposite ends of which bear upon the valve stems. In this connection the cylinder castings are made with integral heads, and each valve cage sits in the head and is held therein by a locking ring. The valve cage has a conical extension which forms an extra bearing for valve stem, thereby giving it a longer guide than often is accomplished in valve-in-the-head motors. Also of paramount importance is the fitting of a dual Bosch high-tension ignition system which takes the place of the make-and-break form previously used on Matheson cars. The ignition system comprises a gear-driven magneto with battery and cylindrical coil on the dash which, by pressing a button in conjunction with a supplementary make-and-break device on the magneto, a spark is produced to start, after which the regular magneto system is switched on. In the carburetor system the use of the pump for drawing gasoline from the fuel tank in the carburetor is eliminated and a float control established. Intake and exhaust valves are of the flat-seated type with a  $2\frac{5}{8}$  diameter over all and a clear opening of 2 inches. The cylinders are  $4\frac{1}{2}$  by 5 inches, this being a smaller size than used on 1908 four-cylinder machines. In the running gear the presence of Timken roller bearings for the front wheels is new, as are the dropping of the frame members in front of the rear axle and the employment of three-quarter elliptic back springs. The lower motor casting is an aluminum one webbed to fill the entire space between the side members of the frame, thus eliminating the use of a mud apron. This casting extends rearward to the back of the flywheel where it is joined by a sheet steel apron extending practically to the back axle. Last, but not least, is the new combined rear axle and gearbox forming a unit, the selective gearset offering three forward variations. Annular bearings are used entirely in this unit. A change in the brake system is the employment of transverse equalizers working through slots in the side members of the frame. A housing is provided for the propellershaft and but one universal joint is employed in it.

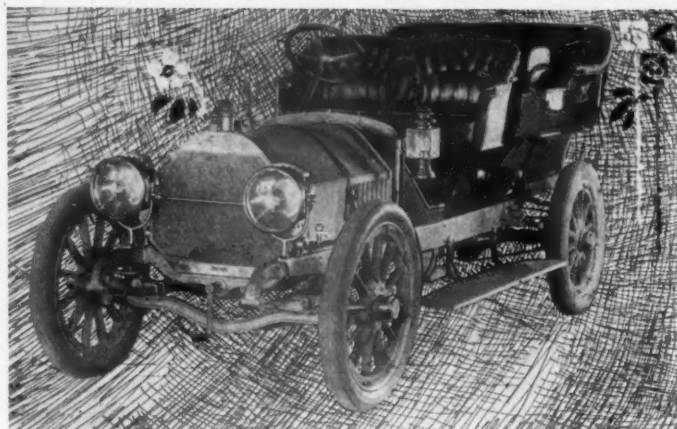
### ■ PLAM ■

**Elmore**—With the exception of a few new features the Elmore cars for 1909 are practically unchanged. The new features are: Offset crankshaft, an Atwater Kent generator located on the dash and gear-driven off the rear end of crankshaft, water circulation improved by means of a gear-driven pump used in connection with the thermo-syphon piping, Brown-Lipe steering gear, dropped frame, longer springs, 4-inch tires, and a simpler clutch arrangement. The Elmore company has placed two models on the market, Nos. 33 and 44. No. 33, the

FRANKLIN MODEL G ROADSTER



CHALMERS-DETROIT FORTY ROADSTER

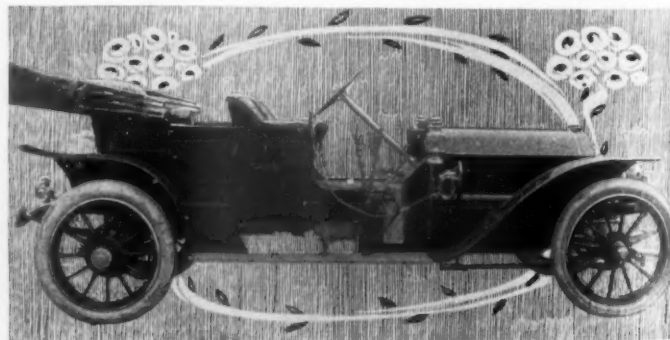


WALTER TOURING CAR MODEL

smaller of the two, is practically the same as the No. 44, except that it has but three cylinders, 104-inch wheel base, 32-inch wheels and is of lighter construction in general. No. 44 has a four-cylinder motor with  $4\frac{1}{2}$ -inch bore by 4-inch stroke. Lubrication is by means of oil mechanically forced into the cylinders through the intake pipe and by leads to the crankshaft bearings. The carburetor is of the automatic float feed type. Ignition is the new Elmore system, equipped with Atwater Kent generator. The running gear is comprised of a pressed steel drop frame, semi-elliptic front springs, platform suspension in the rear with Sager auxiliary coil springs as shock absorbers, rear axle of pressed steel tubing, drop-forged I-beam front axle and ball bearing wheels equipped with 34 by 4-inch tires. The operation of the two-cycle Elmore motor remains unaltered, the two-part principle being continued, in which the mixture is drawn into gas-tight compartments in the crankcase, and then transmitted through bypass channels in the cylinder walls to the combustion chambers. The reciprocation of the pistons covers and uncovers the intake and exhaust parts, admitting mixture at the proper time and also freeing the exhaust. Deflector plates on the piston heads assist in the scavenging of the cylinders. The motor is without valves or camshafts.

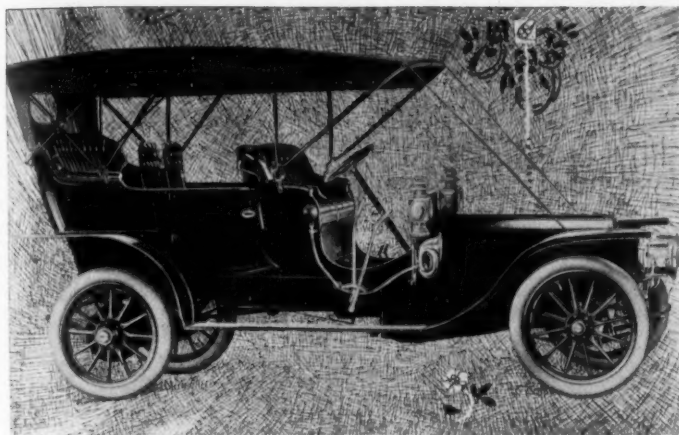
### ■ PLAM ■

**Palmer & Singer**—The Palmer & Singer line of cars includes four chassis with four sizes of motors and divided between four and six-cylinder types. There are two six-cylinder models: Model LXII with  $4\frac{7}{8}$  by  $5\frac{1}{2}$ -inch cylinders, has them cast in pairs and is built in roadster and baby tonneau style with 126-inch wheelbase; the other six-cylinder model has  $4\frac{3}{4}$  by  $5\frac{1}{2}$ -inch separately-cast cylinders. The two four-cylinder sizes are both made with twin cylinder castings, a seven-passenger touring car using 5 by 5-inch sizes and  $4\frac{1}{4}$  by  $4\frac{1}{2}$ -inch cylinders employed on a roadster, baby tonneau and a town car. The wheelbases range from 107 to 126 inches. P. & S. lubrication is of the crankcase-contained type, a gear pump elevating the oil into a tank above the cylinders from a crankcase pump, whence it flows by gravity to the crankcase bearings. From



APPERSON SIX-CYLINDER TOURING CAR





FRANKLIN MODEL H SIX-CYLINDER

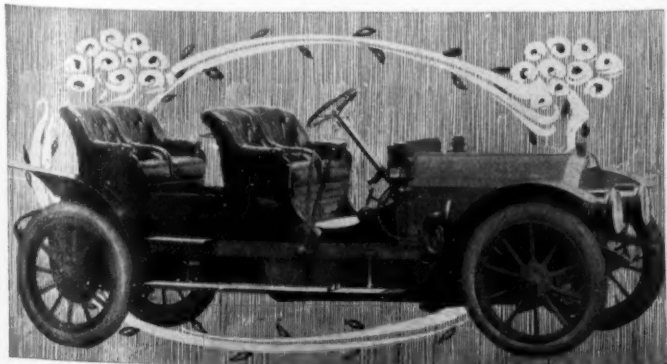
these the oil passes through the drilled crankshaft to the lower connecting rod bearings. Double ignition system is used on all except the 4¼ and 4½-inch chassis, the major set being the Bosch magneto. Use is made on all four models of a four-speed gearset giving direct drive on the third speed. Imported F. & S. bearings are used throughout excepting in the motor. The clutch, housed in a forward compartment of the gearbox, contains fifty-one conoidal disks operating in oil. Both sets of brakes are expanding metal-to-metal ones operating within the rear wheel drums. On the town car a conspicuous feature is the double drop frame between the axles allowing of a low door and eliminating the running board.



**Simplex**—The Simplex cars offered by the Palmer & Singer Co. are much the same as in 1908 except for the addition of a speed roadster, which is a duplicate of the car that competed in the grand prize race at Savannah. It is made with a 6.1-inch bore and 5¼-inch stroke and has a guaranteed speed of 90 miles an hour. With the exception of larger cylinders and valves the chassis of this car is a duplicate of the regular Simplex chassis which figured in 24-hour races during the past season. Its body seats two passengers and has large transverse cylindrical gasoline and oil tanks.



**Stevens-Duryea**—Two new models are added to the Stevens-Duryea line for 1909—model Y, a six-cylinder, seven-passenger touring car rated at 40-horsepower, and model XXX, a four-cylinder, 24-horsepower roadster with a single rumble seat. All models are practically of the same design. The unit power plant in which the crankshaft, clutch and gearset are enclosed is a cylindrical case of aluminum alloy suspended from the frame by two arms at the front end and rests on a rocker at the rear, thereby unaffected by any twisting of the frame. The cylinders are cast in pairs, intake and exhaust valves on the same side and integrally cast waterjackets operated by one



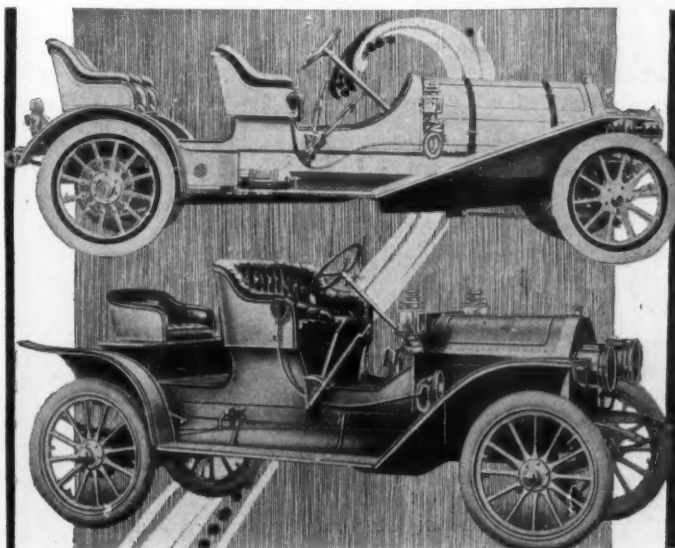
PIERCE-ARROW 6-36 ROADSTER

camshaft. This is the first season the casting of cylinders in pairs has been used. Double ignition is used with Bosch high-tension magneto multiple coil. A large cellular radiator, centrifugal pump and belt-driven from the flywheel which is located in front of the motor. Lubrication is by means of a force feed, shaft-driven mechanical oiler; the transmission gears run in an oil bath and the steering gears, cardan joint and differential, are packed with grease. The clutch is of the multiple disk type and consists of two sets of steel disks, one set being lined with asbestos, making oil unnecessary. The transmission is of the selective type with three forward speeds. The frame, of chrome nickel steel channel section, is supported in the rear by semi-elliptic springs on a floating type rear axle. The wheelbase is 109 inches in model XXX, and 142 inches in model Y. Annular bearings are used throughout the car except in the motor where babbitt metal is used. There are two sets of brakes, both operating on rear wheel drums. The service brakes, operated by pedals, are contracting and lined with asbestos. The expanding are metal-to-metal, operated by hand emergency levers. The bodies are of rolled sheet aluminum, built on a wood frame work and are of tasty design and workmanship.



**E-M-F**—A new arrival on the field for 1909 is the E-M-F, built by the Everitt-Metzger-Flanders Co. of Detroit, Mich. This company, which is a combination of the Wayne and Northern companies, together with other interests, is devoting its energy to the production of a single chassis with touring car, tourabout, demi-tonneau and roadster bodies. The 30-horsepower motor is of the four-cylinder type, with 4-inch bore by 4½-inch stroke. Cylinders are cast in pairs with integral water jackets, and valves all on one side and mechanically operated. The valves are extremely large, made from drop forged steel and operated from a single camshaft with all cams integral. The crankshaft is offset ¾ of an inch and runs on three long bearings of special babbitt. The pistons are 5 inches long and fitted with four rings. The crankcase is of cast aluminum supported on pressed steel members in U section, and provided with hand holes in the bottom for adjusting the rods. Lubrication is by splash, the level being maintained by means of an automatic vacuum feed oiler cast integral with the crankcase. Double ignition is used with gear-driven magneto and battery. A vertical tube radiator, gear-driven centrifugal pump and a belt-driven fan are features of the cooling system. The clutch is of the expanding ring type, leather-faced and contained in the flywheel. The transmission, of the selective type, is enclosed in a case cast integral with the differential housing of the rear

THOMAS FLYER 6-70 ROADSTER



E-M-F THIRTY AS A ROADSTER

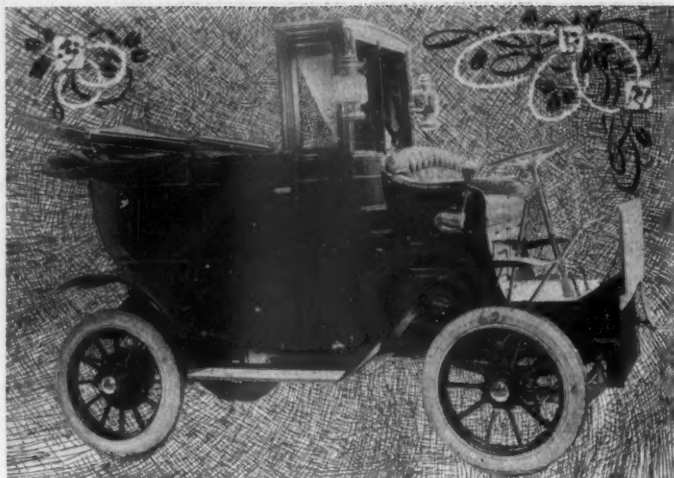
axle, and has three forward speeds. The rear axle is of exclusive E-M-F design and equipped with Timken and Hyatt roller bearings. Semi-elliptic front and full elliptic rear springs support the pressed steel, offset, drop frame, and the ball bearing wheels are equipped with 32 by 3½-inch tires. Oil cups are fitted to steering knuckles, spring connections, and to every joint that requires lubrication.

### ■ PLAM ■

**Corbin**—A line of seven body styles, all mounted on the 30-horsepower chassis, constitutes the 1909 menu for the Corbin company. The roadster, baby tonneau and five-passenger touring car all have a 108-inch wheelbase; whereas, the seven-passenger touring car and closed vehicles have 114-inch wheelbase. The chassis are practically alike in other respects with the exception that the seven-passenger car and the limousines have dropped frames and employ rear platform springs. Conspicuous in the alterations made in this chassis is changing the cam contour so that the intake valves remain open longer, the result being a claimed increase of 5 per cent and the possible speed of 2,200 revolutions per minute for the motor. The crankshaft is made heavier and is carried on Hess-Bright end bearings and a plain center bearing. In conjunction with the cooling system is the employment of a Mayo cellular radiator. The clutch pedal operates with exceptional ease, due to a compound coupling between it and the yokes for disengaging the clutch. From the pedal arm a horizontal rod extends forward and hinges to the top of the vertical lever which fulcrums at its center and at its lower end is stirrup-shaped, each arm carrying a Hess-Bright bearing for engaging in the clutch shifting collar. Due to this compound leverage the clutch is engaged with the slightest pressure in spite of the increased tension of its spring. In the propellershaft a new type of Hartford universal joint is used and the external fabric-lined rear wheel brakes are improved and of the double acting type. The expanding brakes remain of the metal-to-metal variety. A change in the body is making the rear seat 5 inches wider, bringing the measurement up to 52 inches. The brake drums on the rear wheels are now bolted to every other spoke and in the steering mechanism the tie-rod has been changed from in front of to behind the front axle. The integral spring seatings on the forward axles are wider and improvements have been made in the axle jaws for taking the steering knuckle.

### ■ PLAM ■

**Columbia**—As regards the Columbia gasoline cars for 1909 made by the Electric Vehicle company, few changes are apparent but a number of improvements have been made. A uniform size of frame and length of wheelbase is now used under all styles of bodies, providing a chassis equally useful for all conditions of service. The forward engine gears now have spiral cut teeth with increased width of face and operated in an aluminum case provided with a felt washer to prevent leakage of oil. The valve and igniter shafts, also mag-

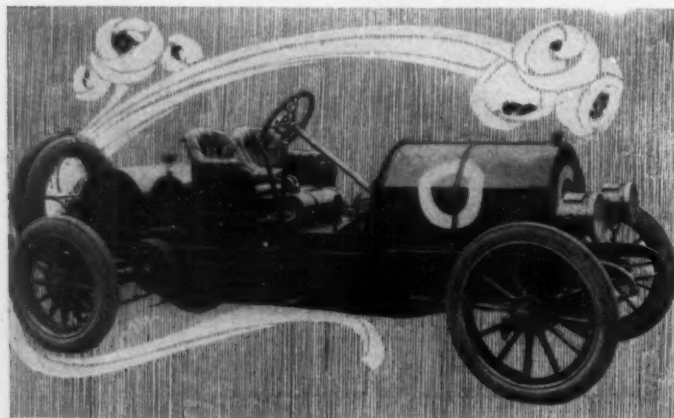


AUTOCAR MODEL TOWN CAR

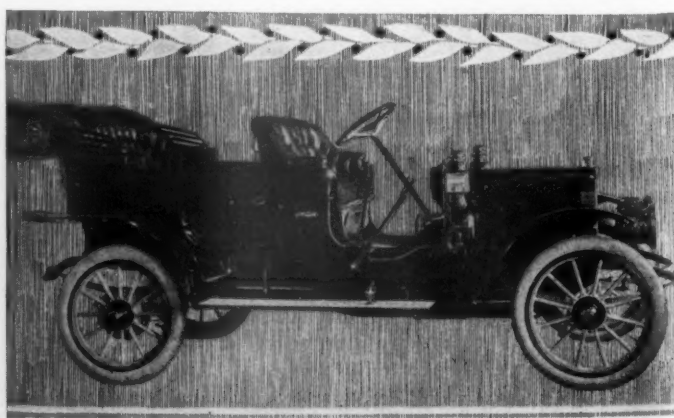
neto and pump shafts, are now supported at the forward ends outside of the gears on Hess-Bright ball bearings. The low-tension Bosch magneto has now been adopted and the igniter plates are of drop forged steel and ground to fit. The radiator used is of the extension-section, flush joint tank design. The strut arms on the rear axles have been moved outward to provide more clearance, and the body designs are all new, perfectly plain, yet artistic in design. The standard chassis, then, has a four-cylinder motor with cylinders in pairs and valves on one side. The bore and stroke are 4¼ by 4½ inches respectively. A cellular radiator, fan flywheel and gear-driven centrifugal pump are used in the cooling system. Ignition is by make-and-brake with Bosch low-tension magneto. Lubrication is by splash in the crankcase, the oil level being maintain by overflow dams. The oil is circulated, after being strained, by a gear pump. Crankshaft and connecting rod bearings are of babbitt-lined bronze, and the forward end of the camshaft, magneto, and pump shafts run on Hess-Bright ball bearings. A Columbia multiple-jet carbureter with an auxiliary air valve is fitted, and controlled by hand throttle on the steering wheel and foot accelerator. The clutch is a leather-faced cone with bronze shoes. The transmission is of the sliding gear type with three forward speeds and runs on Hess-Bright bearings. A pressed steel frame, semi-elliptic springs, floating-type rear axle, worm-and-sector steering gear, I-beam front axle, and 34-inch wheels, internal and external brakes on rear wheel drums, and Hess-Bright bearings throughout, comprise the running gear.

### ■ PLAM ■

**Walter**—The Walter line for 1909 consists of two types of chassis, a 50-horsepower car for touring and a 20-horsepower car for city use. The motor of the 50-horsepower car is of the four-cylinder four-cycle vertical type with integrally cast heads, valve chambers and water jackets, and the bore and stroke is 5½ inches.

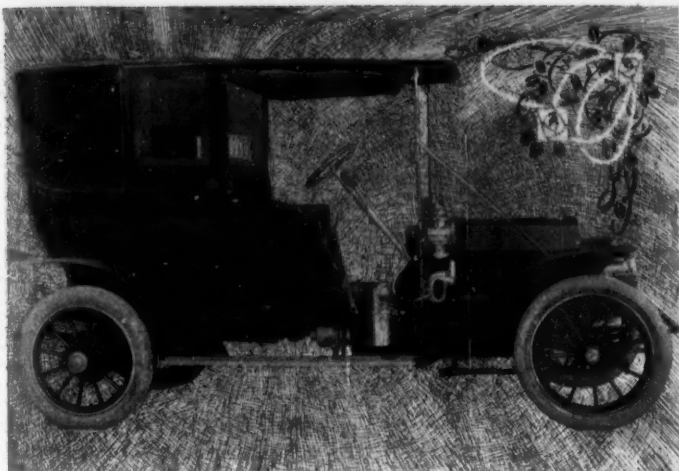


SIMPLEX ROADSTER WITH 90-HORSEPOWER MOTOR



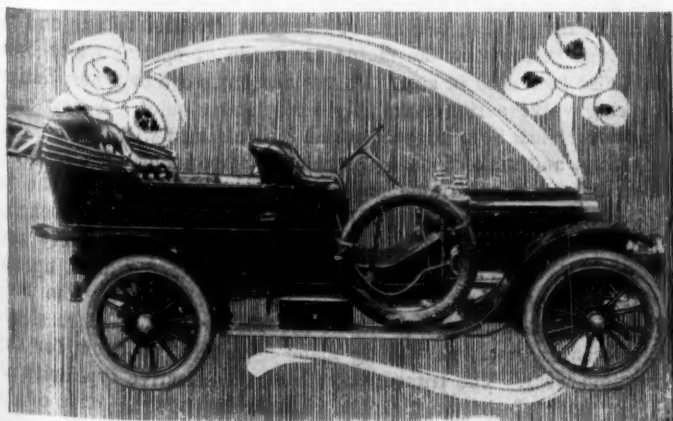
SELDEN IN TOURING CAR FORM





APPERSON'S NEW TAXICAB

Intake and exhaust valves are on opposite side and driven off of camshafts located in the crankcase. All cylinders, pistons and piston ring castings are imported from Paris, France. The crankcase is of aluminum, with integral gear housing, and the lower portion which serves as an oil reservoir is removable for inspection of bearings. Lubrication is by means of a gear-driven gear pump, through a sight feed on the dash to all bearings within the crankcase. Cooling is by means of a gear-driven centrifugal pump, gear-driven fan, and radiator. Ignition is by jump spark with high-tension magneto and batteries and one set of plugs, or low-tension magneto and make-and-break, the motor being designed for either system. A cone clutch is used, and the transmission gear of the selective sliding gear type has four forward speeds, and all shafts and gears are made of Krupp chrome nickel steel, case hardened, ground and mounted on Hess-Bright ball bearings. Transmission from gear set to rear wheels is by means of a propellershaft and a floating type rear axle. The frame of imported pressed steel is raised in the rear to allow for spring clearance and fitted with three-quarter platform springs on the touring car and semi-elliptic on the runabout. Springs are all imported of Lemoine manufacture. The steering gear is of the irreversible type, and of strong construction. Brakes are both internal and located side by side in rear wheel drums. Thirty-six by 4 and 36 by 5-inch tires are used on the touring cars with 122-inch wheelbase; while the runabout is equipped with 36 by 4-inch tires all around and has a 116-inch wheelbase. With the exception of the following characteristics, the 20-horsepower town car closely resembles the larger car in its mechanical construction. The motor is the same except that the cylinders have a  $4\frac{1}{4}$ -inch bore by 4-inch stroke and cooling is by means of the thermo-syphon system. The gearcase has three speeds forward and one reverse; the wheelbase is 104 inches and wheels are 36 inches in diameter. Three-quarter platform springs are used in the rear, the same as on the large touring car. This car will be



ELMORE TOURING CAR, MODEL 33

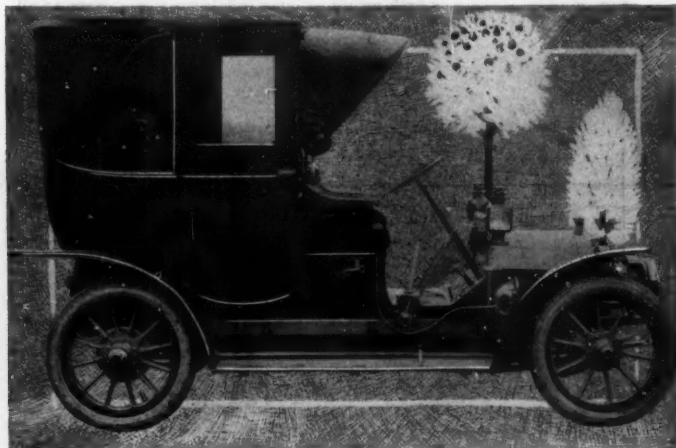
very light, comfortable and practicable for shopping and suburban use. All Walter engines are high-speed motors, their designers being strong adherents to the short-stroke principle, which increases the thermo-dynamic efficiency of the engine. The new model will be called the Roebeling-Planche.

### ■ PLAM ■

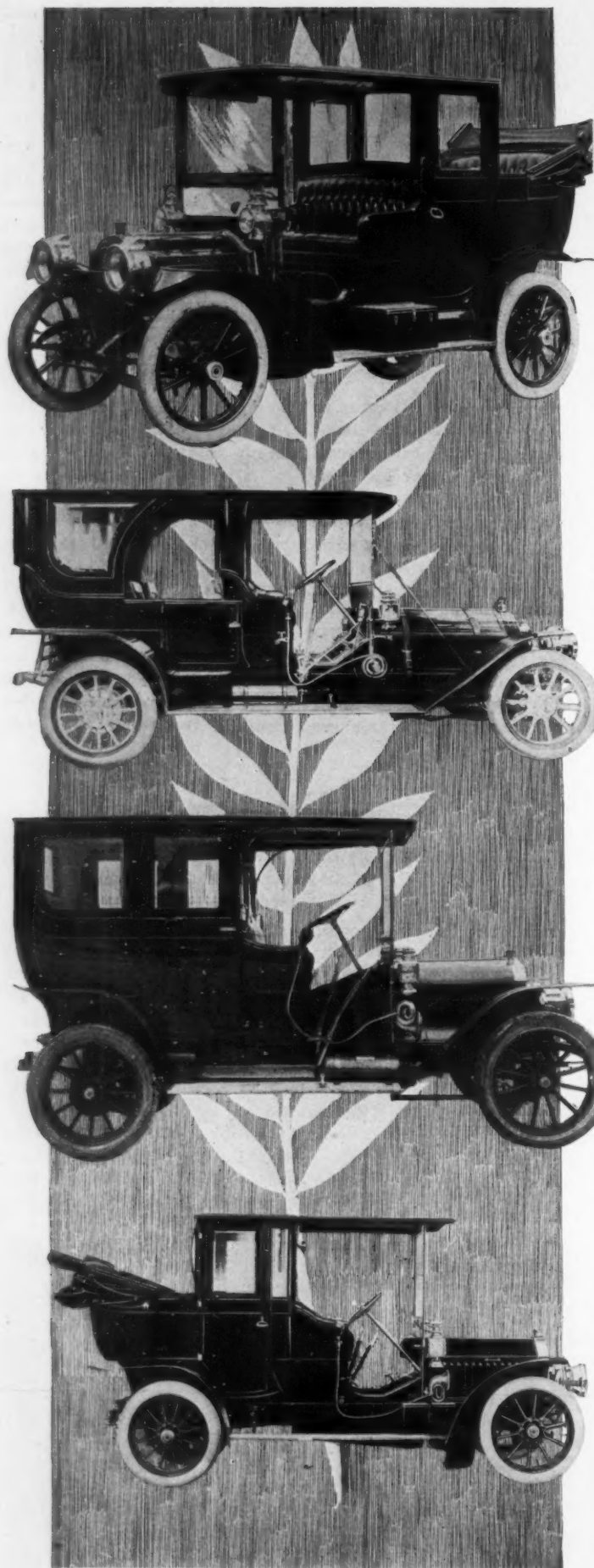
**Selden**—For 1909 the Selden Motor Vehicle Co. is using the same chassis for its roadster, limousine, landaulet, toy-tonneau and touring car models. A four-cylinder 28-30-horsepower motor is used, the  $4\frac{1}{4}$  by  $4\frac{1}{2}$  inch cylinders being cast in pairs and offset from the crankshaft. The valves being placed on the right side, this permits of the carbureter, timer and magneto shaft being located convenient for connections. The carbureter is of the single-jet gravity feed type, while the lubrication scheme consists in keeping the oil constantly in circulation by a gear pump driven by an extension off the commutator shaft. The reserve lubricant is located in a lower oil well cast integral with the lower half of the crankcase, the well holding 3 quarts, and being filled by pouring the lubricant into the breather pipe located on the back of the motor. After the pump has done its work, the oil passes into the four compartments of the crankcase, and after raising to the proper level, falls again into the oil well. In the way of axles, the front one is the I-beam type, while the rear is semi-floating. Ball bearings are used in the front wheels and Hyatt rollers in the rear. Jump spark ignition is used, and on the upper end of the oil pump shaft is located a roller timer. The selective type of transmission gives three speeds forward, while a leather cone clutch is used. The car is shaft-driven, has a wheelbase of 114 inches, and is fitted with 34 by  $3\frac{1}{2}$ -inch wheels in front and 34 by 4-inch in the rear. Two sets of rear hub brakes are fitted and the frame is of cold pressed steel.

### ■ PLAM ■

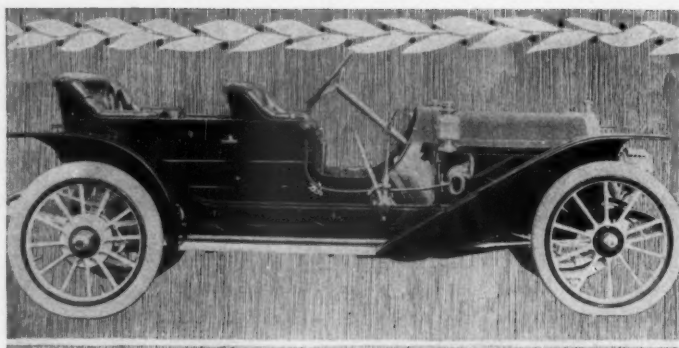
**Stearns**—The Stearns company has given birth to an entirely new model this year in the form of a 15-30 horsepower small car with a four-cylinder motor, with integral heads, valves and waterjackets cast en bloc. Intake and exhaust valves are all on one side and operated from one camshaft, located within the crankcase which, by the way, is of a one-piece construction with hand hole plates on the left side. The crankshaft is supported on three annular ball bearings and in fact all the bearings in the motor, except those of the connecting rods, are of the annular type. Cooling is by means of a gear-driven pump located in the left forward engine leg; an adjustable belt-driven, ball-bearing fan, and a Mercedes type radiator. Lubrication is by splash, the level being maintained by a gear-driven, mechanical oiler located in the right forward leg of the motor, and a 5-gallon reserve tank is connected with the crankcase with a hand pump on the dash for emergency. Dual ignition is used with one set of plugs, current supplied by Bosch magneto and batteries. The transmission is by means of a Hele-Shaw clutch and



THOMAS AS A TOWN CAR



PACKARD EIGHTEEN TOWN CAR  
 THOMAS 6-70 DEMI-LIMOUSINE  
 CORBIN TOWN CAR  
 PEERLESS TOWN CAR



THOMAS 6-40 FLYABOUT

straight-line shaft drive to the change speed gear on the rear axle. The design of the driving mechanism on this model combines a cast case for enclosing the gears with a solid one-piece forged steel axle for mounting the rear wheels. The wheels are driven by floating shafts extending from jaw clutches on the outer ends of the hubs through the axle, to squared connections on the differential gears. With the exception of the location of the change-speed gears, this construction is the same as on the 30-60-horsepower shaft-driven model. The speed changes are of the selective type with three forward speeds. The brakes are of the usual internal and external type on the rear wheels. The wheelbase is 116 inches and 34-inch wheels are used. In producing this smaller model, the company has aimed to make it equal in design, material and workmanship of its larger cars. It has been well tried out and this company is confident that it will but add to the prestige of its product. The 30-60-horsepower model resembles the small car in every way except that it is of heavier construction, has a bore and stroke of 5 3/8 by 5 1/2 inches respectively, cylinders cast in pairs, expanding band clutch, transmission case located amidship, four forward speeds, 36-inch wheels, 121-inch wheelbase, and is built with chain or shaft drive. The 45-90-horsepower chassis is identical with the 30-60-horsepower chassis except that two cylinders are added, and of course all necessary mechanical points that need heavier material, etc., to take care of the general horsepower generated by the motor have been provided for. Side chain drive is used; the service brake is located in the jackshaft and the wheelbase is 128 inches. These chassis may be fitted with any style body of modern construction, including the toy tonneau, the origin of which is due to this company.

#### ■ DIAM ■

Pope-Hartford—Three models will comprise the Pope-Hartford line for 1909, a touring car, roadster and pony tonneau, all of which will be mounted on practically the same chassis. Many improvements have been made in this year's car over those of last year, as may be seen from a glance at the specifications. The forward engine gears are now all enclosed in a case integral with the crankcase and run in oil. A new method for cutting the gears and a new arrangement of the same, insures smooth and quiet running. The crankshaft has been increased in size and the bearings throughout the motor are made of special white brass and also increased in size. Valves and cams are of a new design, making valve action extremely smooth and quiet. A new style carbureter has been adopted which it is claimed will insure easier starting, and make flooding practically impossible. The motor is mounted on a sub-frame and so arranged as to permit the removal of the camshaft and all gears without removing the engine from the frame. The clutch and coupling are of entirely new design, 1 1/4 inch larger in diameter and covered with a special material, corks being omitted. The clutch bearing has been greatly increased in length, and the design of the square sleeve has been changed, now being made adjustable to allow for any possible wear. The transmission is of the selective type with all gears made of chrome nickel steel, and the engaging ends of the teeth are beveled by a new process to facilitate meshing when changing gears. The gear-changing mechanism is entirely en-



closed within the gearcase, which is of three-point suspension. The Timken bearings on the bevel gear and differential construction have been greatly increased in strength, and the rear axle shafts are now constructed of nickel steel. A screw adjustment has been made for the Timken bearings of the bevel pinion shaft. The rear axle is now of the floating type, and the wheels run on large Timken bearings carried on the outside of the rear axle tube. This style of axle makes it possible to remove the axle-shafts and entire differential construction with the car standing on its wheels. An important feature of the rear axle is the addition of a new torsion rod of entirely new design, acting through buffer springs to relieve all shocks incurred in traveling over rough roads. The brakes, both on propeller shaft and rear wheels, have been improved. The rear springs have been increased in length, and the spring seats are swiveled on the rear axle. The hood is of new design, made without doors and hinged in three places. The sides of the hood are straight, making it possible to open the entire side, and the radiator is changed to conform with same. Mud guards of patent leather are provided between the fenders and the frame. Wheels are 34 by 4 inches all around.

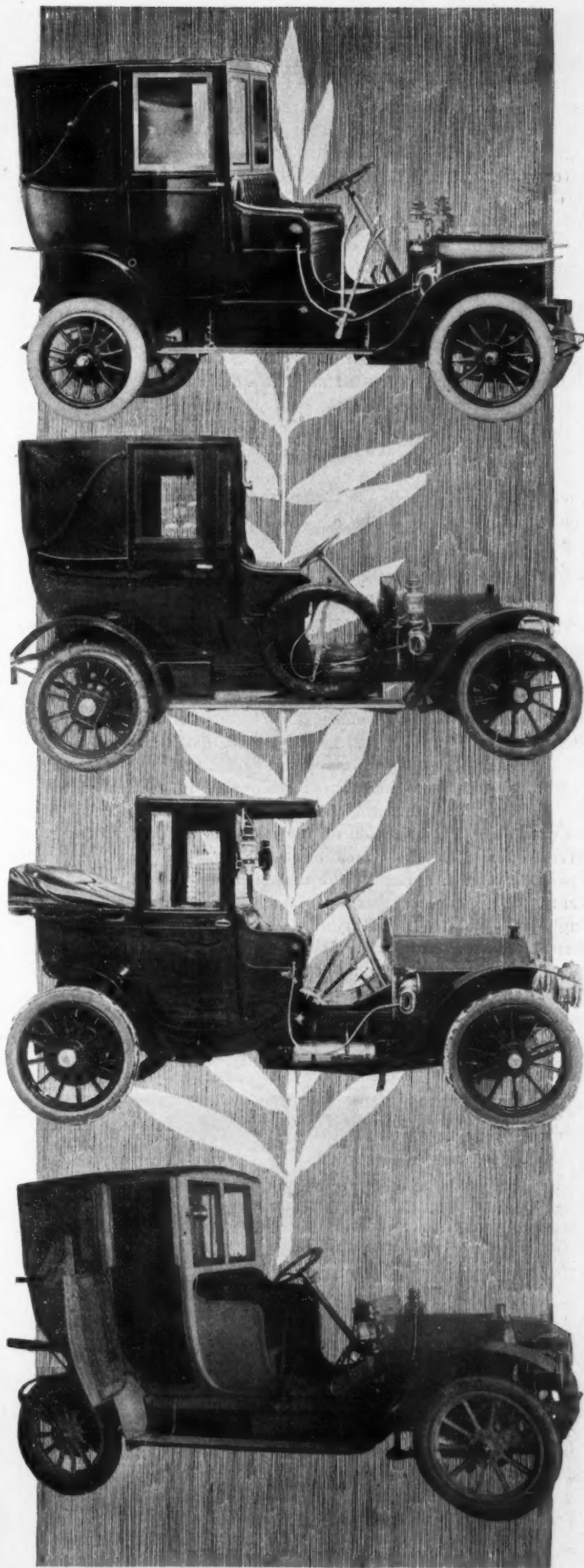
### ■ DIAM ■

**Autocar**—The Autocar company offers to the public the new type XX tourabout for 1909, a 26-horsepower machine designed to meet the requirements of those desiring a moderate-priced car, and which is convertible into a runabout seating two, a roadster seating three, and a tourabout seating four persons. The location of the control side levers inside of the chassis frame permits the use of an entirely closed coupe body on the regular chassis, thus making the car particularly useful for physicians and business men who wish complete protection in wintry and inclement weather. The motor is of the four-cylinder vertical type, with 4-inch bore and 4½-inch stroke. All valves are mechanically operated, the intake valves being in the head and exhaust at the side. The crankshaft, of special steel, heat-treated, runs on bronze bearings and is supported in a cast aluminum crankcase. Cooling is by means of a vertical tube radiator and a centrifugal water pump. Lubrication is by means of a three-lead force-feed oiler, which is gear-driven and supplies oil direct to the main crankshaft bearings and crankcase, from which the pistons, connecting rods, etc., are oiled by splash. Ignition is by jump spark from the low-tension magneto. The clutch is an Autocar feature and is of the floating ring, self-aligning, selective type with three speeds forward and reverse. Shaft-drive is used with a semi-floating rear axle; the front axle is of L-beam section and both are equipped with adjustable roller bearings. The rear springs are full-elliptics, scroll type; the wheelbase is 102 inches and the wheels are equipped with 32 by 3½-inch tires and quick-detachable universal rims.

**Royal Tourist**—The Royal Tourist for 1909 is practically an entirely new model and will be known as M 1909. The cylinders of this new car will have a bore and stroke of 5½ by 6 inches respectively, running from 100 to 1,800 revolutions per minute. The main frame will be on a three-point suspension and no



PALMER & SINGER SIX-CYLINDER



FRANKLIN AIR-COOLED TOWN CAB

STEARNS TOWN CAB

PALMER & SINGER TOWN CAR

PIERCE-ARROW 24 TOWN CAR

sub-frame will be used. A new double oiling system is adopted in which the mechanical oiler and a gear-driven oil pump are used. The mechanical force-feed oiler feeds to the three main bearings, while the oil pump, located in the bottom of the crankcase, maintains a circulation to the other motor bearings. This method is fully described on page 34. An improved form of high-tension switch has been provided, by which the magneto or battery and coil may be used with but one set of plugs. A valveless carburetor of the venturi tube type has been adopted. A four-speed selective type transmission with three-point suspension is a feature of this model and the steering gear is provided with ball joint connections of a forked type, which cannot come loose through wear. The frame is  $5\frac{1}{2}$  inches deep, of  $\frac{1}{4}$ -inch chrome nickel steel, set very low and raised at the rear for spring action. Three-quarter platform springs are used in the rear. The rear axle casing is divided horizontally in the center instead of vertically as before. A pressed steel torque rod takes up the gear reaction, and drop forged strut rods are provided for driving and braking strains. A ratchet sprag, enclosed on the strut rods, acts directly on the rear brake drums and is operated by a small hand lever. The front axle is a one-piece drop forging of L-beam section. The wheelbase is 126 inches and wheels are equipped with Timken bearings, and 36 by  $4\frac{1}{2}$  front and 36 by 5-inch rear tires. The body is of pressed steel convex type, and fenders on the machine are improved.

#### ■ PAM ■

**Thomas**—The features of the Thomas line for 1909 are the 40-horsepower six-cylinder car and the four-cylinder 16-horsepower town car. In this new six-cylinder car, the cylinders are cast in blocks of three. Valves are all on one side, and operated off of one ball-bearing camshaft. The crankshaft is also supported on three annular ball bearings with ball thrust on the rear end. The crankcase is of one-piece cast aluminum construction with three-point suspension, and removable inspection plates at the bottom. The forward gear housing is cast integral with the crankcase. Lubrication of the motor is by means of a gear-driven oiler with sight feed on the dash. Ignition is by two separate systems, a Bosch high-tension magneto and an Atwater Kent timer, and two sets of plugs. The carburetor is of the single-jet, float-feed, waterjacketed type, with automatic air control. Water circulation is by means of gear-driven pump and fan blades are attached to the periphery of the flywheel. The clutch is of the three-disk Thomas design. The transmission, located on the rear axle, has three speeds forward, and is of the selective type and fitted with annular ball bearings. The propeller shaft is enclosed in a steel tubing and has but one uni-

versal joint at the forward end. A floating type rear axle is used and supports the drop frame which is narrowed in front to facilitate turning in a small radius. Brakes are of the internal and external type on the rear wheel drums. The town car has but four cylinders, cast *en bloc*. It has a manganese bronze crankcase. Single ignition with high-tension magneto is used; cooling is by thermo-syphon system; and the brakes have been redesigned, giving internal and external sets. In connection with these two shaft-driven models, the company continues its four-cylinder 60-horsepower and six-cylinder 70-horsepower cars with side chain-drive. These cars have separately-cast cylinders. Herringbone motor gears are used; the water pump is increased in size, and the wiring is enclosed in sheet brass tubes with fiber insulators. In the six-cylinder car the radiator has been increased, and the countershaft brakes are lined with raybestos.

#### ■ PAM ■

**Pope-Toledo**—Pope-Toledo types, XXII touring car, XXI runabout and XXIV close-coupled bodies, in all their general mechanical construction are similar to the 1908 cars excepting in some details, as follows: In lubricating the timing gears of the engine a soft grease was used last year, but this year a passage way is left between the crank pit and this gear housing and these gears are now lubricated by a continuous stream of oil. The brake mechanism has been altered to give a little sharper action. The type XXIV, an entirely new body design, is a cross between a close-coupled body and a toy tonneau, the intention of it being to furnish a car with greater comfort than the average toy tonneau, yet not so large as the close-coupled body. This model is also provided with a sharply-inclined steering post of the runabout type and a runabout dash is furnished. The seats are hung low, giving a very much runabout position for the driver. The car is made with 126-inch wheelbase, the same as used in the standard tourcar; whereas the runabout wheelbase is 115 inches. The general lines of Pope-Toledo construction remain unaltered, some characteristics of which are the inverted U pressed steel frame construction and the four-cylinder motor employing overhead valve action in which one rocker arm opens and closes the intake and exhaust valve of each cylinder. The lubrication of the motor consists of a sump system from which a pump elevates the oil to levels in the crankcase compartments. The crankshaft is carried on three annular ball bearings. A unifying of the transmission parts is accomplished by carrying the multi-disk clutch in a forward compartment of the selective gearset. Also continued in conjunction with the car is the auxiliary gasoline tank mounted on the dash and fed from the large tank in the rear of the car.



BABCOCK'S GENTLEMAN'S ELECTRIC ROADSTER

ELECTRIC ROADSTER MADE BY ANDERSON CO.



# Electric Vehicles

INTEREST in electric pleasure vehicles is increasing, and while there is little increase in the number of manufacturing concerns, particular enterprise is shown on the part of many of them. What would appear as a direct outcome of the touring tendency is the greater number of roadster-type vehicles, in which a part of the battery—or all of it in some cases—is carried under a bonnet resembling in most respects that of a regular touring car. The steering wheel and column has come in for considerable attention as has the use of rear hub braking.

**Woods Electrics**—One Woods electric model constitutes the company's standard line, and which chassis is fitted with two styles of body—a Queen Victoria with brougham top, and a similar body without top. In this chassis the regular Woods construction is continued, but a few alterations have been made. The motor efficiency has been increased, due to increasing the field windings as well as using a different shell steel for the motors. A marked improvement in conjunction with the countershaft is split aluminum castings entirely enclosing each half of the countershaft as well as the universal joints in them. These housings are made with a ground fit to produce a dust and oil-tight casing. An important change in the carrying of the motor and jackshaft is the use of an I-beam sub-frame of Parsons manganese bronze which supports the motor, transmission gears and driving sprockets. This framework bolts directly underneath the side pieces of the main frame, which is an ash member carrying steel armor. The bodies are larger than last year, the length being increased to give more foot room. An improved body equipment consists of internal door locks in addition to the external ones, window locks and tantalum lamps throughout. These cars are regularly equipped with solid tires with an option of regular gasoline touring car heavy type pneumatics. The battery equipment is forty cells nine M. V. Exides. The motors used on these cars are of the four-pole series type of Woods construction. The brush holders are of the reaction type, commutator segments of drop forged copper, and the electrical steel is of special analysis and carefully annealed. Four uniform graduated speeds are provided without resistance.



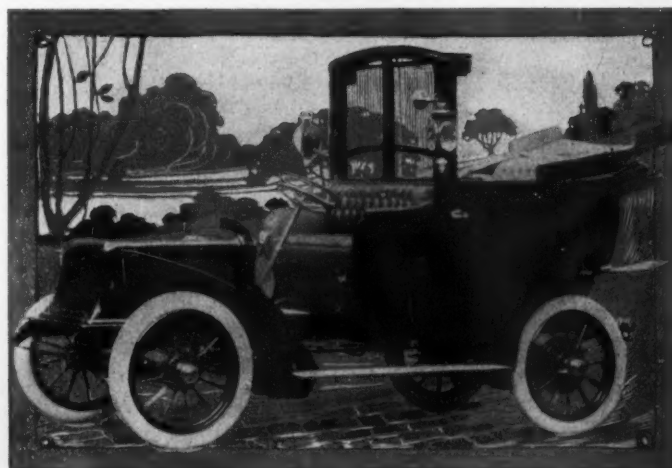
**Babcock**—The Babcock company has listed nine electric models, two of which, models 11 and 12, are entirely new and of 1909 design throughout, being somewhat radical departures from former types of Babcock construction. Model No. 12 is designed with the outward appearance of a gasoline runabout of modern construction, and so clear is the deception that a casual observer being passed by one on the street will be impressed by the silence and smoothness of the running, and ease of control, of what appears to be a modern gasoline runabout. This car is equipped with a top, rear artillery seat, large head lamps, and an extra tire casing strapped on at the left of the driver's seat. The frame is of pressed steel channel section with wood reinforce-



ment. The spring suspension consists of semi-elliptic front and full-elliptic rear springs. Axles are solid and wheels are of the artillery type with ball bearings, and 32 by 3-inch pneumatic tires. The wheelbase is 96 inches. Control is by means of a worm and sector steering gear, with a sloping column and round wooden hand wheel located on the left side, a selective change speed controller in the forward left side of the driver's with five speeds forward and two reverse, and two pedals. The left pedal, which takes the place of the clutch of a gasoline car, greatly resembles its action inasmuch as pressure gradually applied gradually reduces the speed of the car by cutting down the speed of the motor, till current is entirely shut off, when further pressure on the pedal brings into action a service brake on the jackshaft; relieving the pressure on this pedal releases the service brake and applies the power, thereby enabling one to increase or decrease, at will, to any speed within the limit set by the controller. The right pedal is the emergency brake, and acts on a double set of internal expanding and external contracting brakes on the rear wheel drums. The car has side chain-drive, the motor being suspended amidship from the frame, and the space under the hood is occupied by forty-two cells of fifteen-plate batteries. The model 11 is a town car, or taxicab, capable of carrying seven passengers. It resembles model 12 in every way except that it is of heavier construction, has 120-inch wheelbase, is shaft-drive; the frame is braced with truss rods under its side members; a second wheel under the steering wheel takes the place of the change speed lever in the side of the seat; the rear springs are of the scroll type instead of full-elliptic, and 60 miles on a charge is claimed.



**Baker Electric**—The three new features of this company for 1909 are its model S, model P Special and model R roadster. Model S is a runabout built along the general lines of modern gasoline motor car construction. It has a 70-inch wheelbase and 50-inch tread, 32-inch wheels equipped with annular ball bearings and 3½-inch pneumatic tires. The frame is of pressed steel and springs are semi-elliptic front and full-elliptic rear. A 2½-horsepower series-wound motor in connection with Hycap batteries of thirty cells,



BABCOCK ELECTRIC TAXICAB, A NEW IDEA

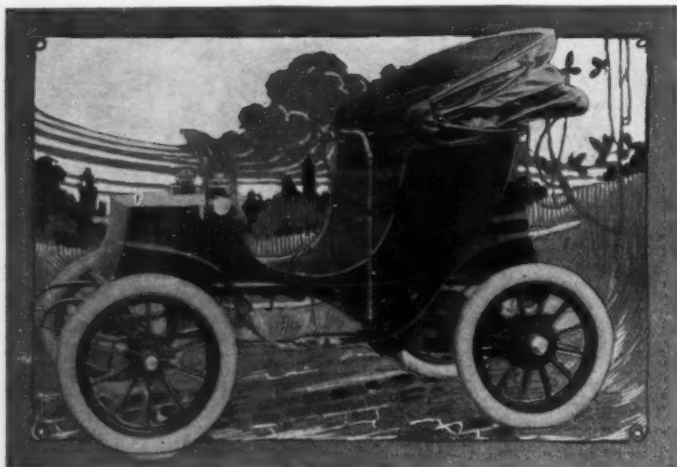


WOODS QUEEN VICTORIA WITH BROUGHAM TOP

eleven plates each, furnishes the power, which is transmitted first to a countershaft, by a Renold chain enclosed in an oil and dust-proof case, thence to rear axle by means of a single chrome nickel roller chain. Control is by means of a steering gear of Baker design, with hand wheel, a controller with six speeds forward and three reverse, located on the steering column just beneath the steering wheel, and two foot brakes. Model P Special is an extension-front coupe, having a seating capacity of four passengers and of the same mechanical construction as model S. The Baker model R is of the runabout type with steering wheel. It is intended strictly for gentlemen's use. The control lever is placed directly under the steering wheel and gives the six forward and three reverse variations. The batteries are in series of all speeds and the cells are located part in front and part in rear of the vehicle. Power is transmitted from the motor to the countershaft by an enclosed Renold chain and the drive from this to the rear axle is through a cone nickel roller chain.



**Studebaker Electric**—Of paramount interest in this year's Studebaker electric line is model 17A chassis of the shaft-driven type, it marking the introduction of this method of drive in preference to side chain by this concern. The chassis is fitted with landaulet, coupe or phaeton type of body. In the make-up of the chassis are incorporated the regular Studebaker type of single motor, but twenty-six cells of eleven-plate battery are used, part carried in front and part in rear. This battery equipment is two cells larger than that employed on the past Studebaker



COLUMBIA ELECTRIC, MODEL 70

models with the exception of the special Suburban which uses thirty-six. Its wheelbase is 71 inches, being in excess of the regular models, and the tire equipment is 30 by 3½ pneumatics.



**Electric Vehicle Co.**—Several vital changes in the construction of the Columbia victoria-phaeton appear for 1909, although in appearance it bears a close resemblance to this type of carriage, as built by the Electric Vehicle company since 1905. An emergency brake is now provided which acts upon a drum attached to the countershaft of the motor. The motor used contains the latest developments determined upon by the General Electric company and transmits its drive through a steel helical pinion and bronze helical gear to a countershaft and thence by sprocket and chain from the countershaft to the rear axle. Two cells of battery have been added, making thirty-two cells of nine P-V Exide, the standard victoria battery. Hess-Bright ball bearings are now used in all four wheels.



**Anderson Electric**—The new creation of the Anderson Carriage Co. is its model L runabout, a car built along the lines of modern gasoline cars with 32 by 3½-inch wheels and 87-inch wheelbase. The body, designed to carry three passengers by the use of the customary rumble seat and 500 pounds of battery under the metal hood, is equipped with a folding top. Double reduction gear is used between motor and rear axle by means of Renold chain and gear, and all moving parts in connection therewith are enclosed and run in oil. Hess-Bright ball bearings



BAKER MODEL S, BUILT ON NEW LINES

are used throughout except in front wheels, which are equipped with Timken roller bearings. The frame is of angle iron construction; springs are three-quarter elliptic, all armored; and brakes are expanding in rear wheel drums and contracting band on motor shaft, all enclosed. The standard steering gear is of the side lever type but steering wheel will be furnished upon specification. In regard to the balance of the line, which consists of four models, A, B, C and D, all interchangeable on the same chassis, a number of noteworthy improvements have been made. The side members of the frame are of one-piece construction full length channel pressed steel ½ inch thick, 3 inches in center and tapering toward front and rear. The power plant, suspended 3 inches, brings the sprocket centers nearer to the horizontal line and the ball-and-socket strut rods have been improved for chain adjustment. The horsepower of the motor has been increased about 50 per cent and one more speed has been added to the control, making five in all. The locking and emergency switch device has been improved and now locks the controller as well as itself. All cars are now being equipped with a new improved type of steering gear, and volt ammeter; windows all



fitted with anti-rattlers; hood equipped with detachable hinge and quick-acting hold-down catch, and rear springs improved. Three different styles of cars will be on exhibition at the New York and Chicago shows, including model D, a four-passenger coupe; model B, a victoria type of Stanhope, and model L, the business man's car.

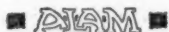


**Waverley Electric**—The Waverley company of Indianapolis, Ind., will show four carriages this year, two of which have never been seen before in motor car exhibitions. These two models are known as Nos. 74 and 75-C. No. 74 is a new design, although in it are combined some of the lines of the old Stanhope and victoria vehicles. No. 75-C is a four-passenger coupe, higher and longer than the same type of vehicle they have been manufacturing under No. 70-C, although made along the same general lines. The distinguishing feature of the new Waverley is the drop sill, brought about by lowering the floor and seat of the car, thereby adding greatly to its convenience in use, and accounts for the compactness of build and trimness and balance of design. Another feature is the use of coupe tops, permitting the use of the car all the year around. A unique feature of this exhibit will be a display of the new rear system of double reduction driving mechanism. The apparatus is to be mounted and connected up in such a way as to show its action. This mechanism is attached to the body instead of the rear axle as previously, thereby allowing the springs to take up the road shock and permitting the use of solid tires. A further advantage claimed for the driving gear is its noiselessness,



WOODS QUEEN VICTORIA

due to a new system of lubrication that keeps the principal bearings in a constant oil bath, and the use of the herring-bone type of gear. Another change in this year's models is the new controller, and the position of the reverse lever now in the seat immediately back of the speed lever, and provided with an automatic locking device.



**Bailey Electric**—One of the unique features of the electric vehicle manufactured by S. R. Bailey & Co. is the control. Although the concern furnishes the conventional wheel, its latest idea in this line is a long lever which is pushed in the direction in which the driver desires the car to go. It is in the form of a D-shaped wheel, carrying the controlling lever, and in appearance greatly resembles the ordinary wheel control. Several other changes are to be noted, among them being the suspension of the motor by three points which is done to keep it in line with the countershaft during the twisting of the frame while the car is under way. Care in guarding the batteries is noticeable, the company now hanging them in one box which is placed under the middle of the car where it is figured there is the least pos-



NO. 74 WAVERLEY, ONE OF NEW MODELS

sible motion. This battery box is made of metal and hung by a three-point suspension in order to protect the jars from breaking or twisting. The mud guards turn with the front wheels, being placed on the knuckles of the axles. Instead of using chrome nickel and nickel steel in the axles, the company pins its faith to rewelded mild open R steel. The body, too, is a novelty, being made of bent wood frame and three-ply laminated wood panels. The company's very large Victoria body weighs only 30 pounds in the wood, and will seat three ordinary sized persons comfortably on the one seat.



**Rauch & Lang**—No radical departures have been made in the mechanical construction of the Rauch & Lang electrics for 1909, the efforts of the makers tending toward the improvement and refinement of those principles which have stood the test of time. Two standard chassis comprise the line of this company. The more popular of these two chassis is the No. 10, a side chain-driven chassis with full-elliptic rear springs, 34-inch wheels equipped with solid Motz tires, and a 74-inch wheelbase. The motor is suspended from three points on the channel steel frame, is capable of a 300 per cent overload, and the entire power plant is enclosed in a dustproof leather case. Forty cells of nine-plate Exide battery supply the current, and the power is transmitted from the motor to a countershaft by means of a silent Renold chain and thence to the rear wheels through side chains. Hess-Bright ball bearings are used throughout the entire driving mechanism while Timken rollers are fitted in the wheels.



BAILEY ELECTRIC WITH UNIQUE CONTROL

# The Commercial Cars

IN a hurried review of the commercial cars which will be on exhibition at the garden show, interest will attach to the exhibit of four-cylinder Knox cars which are now built in air and water-cooled styles. A new face is the Autocar with its two-cylinder line. The Hewitt company had introduced a new model, and the Alden Sampson truck has been fitted with a motor of the company's own design. The status of the electric vehicle has altered but slightly in the year, some of the concerns devoting more attention to the light electric vehicle capable of a load of 350 pounds. Another concern is featuring a 750-pound delivery wagon. It would appear, from a casual inspection, that the light car field is being particularly sought after by the electric makers. In gasoline cars the demountable power plant is a big talking factor, the particular advantages of it being that it eliminates the spare wagon because, by an owner having an additional power plant, it is possible to change it for the incapacitated one in the course of an hour which is a time sacrifice that is acceptable to the reasonable industrial house. On heavy vehicles the dual tire is everywhere used. The problem of brakes has received attention, the surfaces being greatly increased in many cases. Some of the makers have introduced a platform spring at the rear. The magneto is regularly fitted in several cases where a year ago it was supplied as an "extra."

## ALAM

**Knox**—The Knox company rightly deserves the premier position as the pioneer in gasoline truck construction, starting as it did with the single-cylinder type in the early days and progressing through the two-cylinder design up to the four-cylinder make-up now used in 4 and 5-ton trucks for the approaching season. But while entering the four-cylinder commercial field, the company has not diminished its activities along the older lines, and its commercial line-up includes a 1,500-pound delivery wagon with 8 to 10-horsepower single-cylinder air-cooled motor, which transmits through chains to a countershaft and thence by side chains to the rear wheels. This car differs from the early commercial types in the employment of platform rear spring suspension. After the single-cylinder type comes the two-cylinder air-cooled chassis, with a power plant located amid-ship, and so attached to the main frame of the car that in 1 hour's time the motor with planetary gearset can be dropped out of place and a new one fitted. This chassis carries the usual

line of various-types bodies intended for loads of 2,500 pounds. The line of bodies intended for it includes canopy top express sightseeing body and depot bus or canopy top sightseeing wagon with side seats. This chassis is made with two sizes of wheelbases, 97 and 100 inches. In the four-cylinder line the company builds both water and air-cooled types, employing its type G 40-horsepower air-cooled motor, or its type M 55-60-horsepower water-cooled one. In combination with its motor equipment is a three-speed selective gearset with the shaft carried on Timken roller bearings. The four-cylinder trucks are built for 2-ton, 3-ton and 4 and 5-ton loads, the 2-ton model having 125-inch wheelbase, the 3-ton the same and the 4 and 5-ton wheelbase measuring 149 inches. Magneto and dry cells are included in the ignition make-up. Timken roller bearings are used on all the rear wheels and very heavy channel steel main frames are fitted. The heavier sizes have dual rear tires and the load-carrying platform extends over the wheel line. Bodies of varied designs are fitted.

## ALAM

**Autocar**—This concern has launched into the commercial field with a line of two-cylinder shaft-driven cars, largely fashioned after the design of the Autocar runabout. The chassis are made in two sizes, with 85 and 97-inch wheelbase, the former fitted with pneumatic tires for taxicab service, and the latter with solid tires for expressing, delivery and regular usefulness. The power plant, consisting of the two-cylinder opposed motor, the three-disk clutch in the flywheel, and the progressive sliding gearset, is mounted on a quickly-demountable subframe, supported at three points, two in front and a central one at the rear, which permits of removing it by disconnecting the inlet and exhaust water pipes, and the three supports. This system was designed so that an auxiliary power plant could be carried in stock and so avoid the use of duplicate wagons, or the spare wagon in a big system. The motor, as compared with that employed in the runabout, has been improved by the addition of a magneto, mechanical intake valves, and a general rearrangement of parts. Not to be overlooked is the rear axle construction, in which a double reduction gearing is used to get low speed without the employment of too small a bevel on the back of the drive-shaft. To do this a short countershaft is carried in rear of the axle. The propeller shaft transmits this through bevels, and this

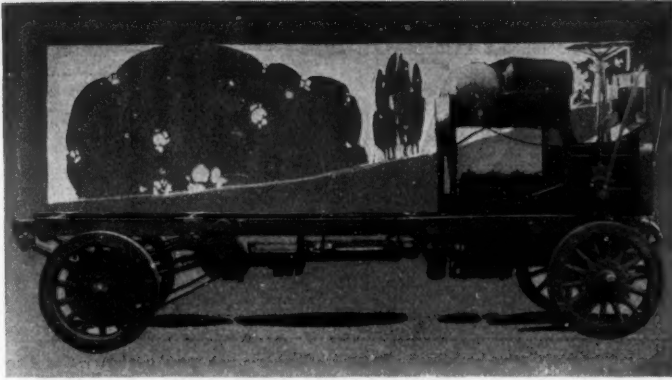


HEWITT GASOLINE TRUCK



GENERAL VEHICLE Co.'s ELECTRIC WAGON





KNOX MODEL 18 5-TON TRUCK

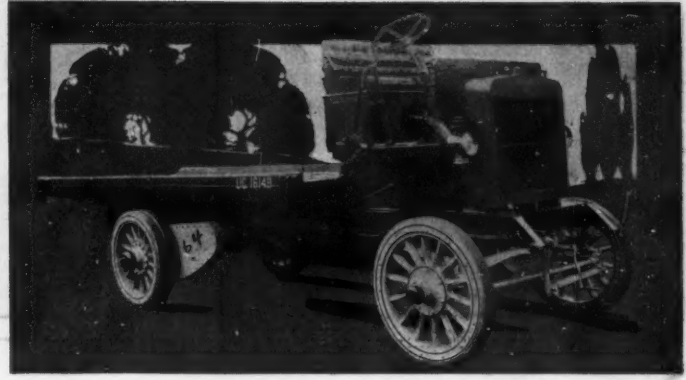
countershaft in turn transmits through spur gears to the rear axle. Timken and Hyatt bearings are employed in this double reduction system, the Hyatt supporting the gear ends of the drive-shaft. On the end of the short countershaft is a drum for an external brake. With this double gear reduction, it is possible to obtain a range of gear ratios from 3.71 to 1 to 5.57 to 1. The running gears have been designed solely for commercial work and comprise tubular front axles fitted with Timken bearings, and the driveshafts in the rear axle are heavy members. The frame is of armored wood combined with pressed steel pieces and supports the car through semi-elliptics in front and full-elliptics in rear. Economy in body design without resorting to changes in the chassis has been accomplished by carrying the motor beneath the seat and hinging the seat so that when tilted backward the motor is completely exposed.



**General Vehicle Co.**—This concern will exhibit five of its seven electric types, the smallest being a delivery runabout with closed body, having a 350-pound load capacity and a mileage of 50. The standard delivery models are built for 2,000 capacity and in addition is a heavy  $3\frac{1}{2}$ -ton trucking body with a stake body. A 2-ton wagon is also manufactured.



**Alden Sampson**—The Alden Sampson 4-ton truck has been improved over last year's type by the substitution of plain instead of roller bearings and the fitting of a four-cylinder four-cycle vertical engine, manufactured and designed by the Alden Sampson company. This engine has twin castings with 5-inch bore and  $5\frac{1}{2}$ -inch stroke and thermo-syphon circulation. The connecting rods are made specially long with unusually large bearing surfaces, the crankpin bearings, for example, being  $2\frac{1}{2}$  inches in diameter by  $4\frac{1}{4}$  inches long. Lubrication is by gear pump within the crankcase, which elevates the oil through the drilled crankshaft to the main and crankpin bearings. Pistons and wristpin



ALDEN SAMPSON 4-TON TRUCK

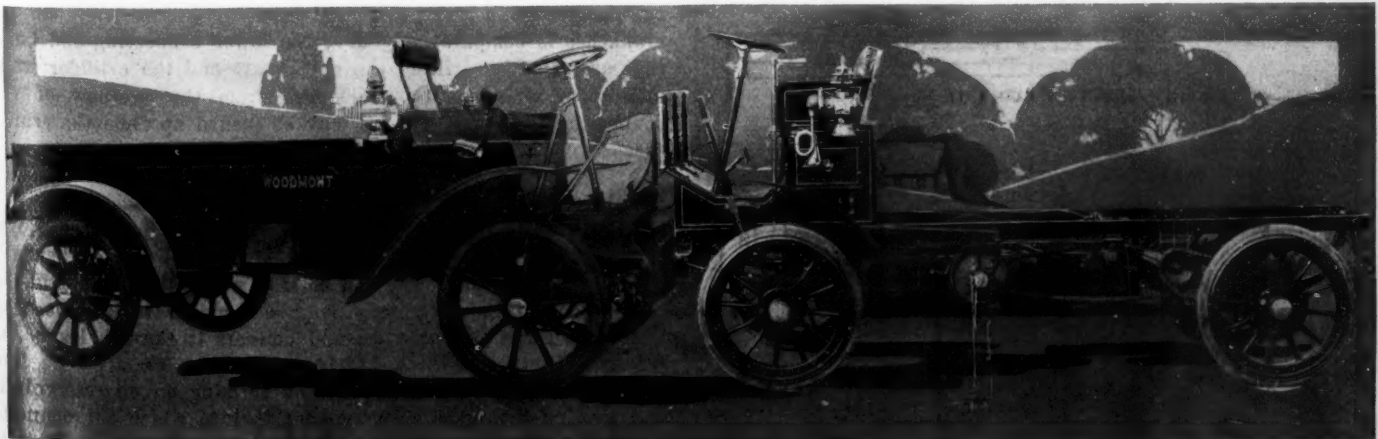
bearings are lubricated by splash from the cylinder walls. These trucks are made with channel frame enclosed drive-chain and dual rear tires. The load-carrying platform does not rest direct on the side members of the frame, but on deep cross sills which extend enough beyond to carry the platform out to the wheel line.



**Hewitt Motor Co.**—This concern will exhibit its 2-ton truck chassis fitted with its new opposed thermo-syphon motor and the same planetary gearset is used on all models. In addition to this chassis the 5-ton truck will be exhibited, in which the only change over last year are some alterations in the universal joints, the fitting of a governor to the motor, and one or two other details. The exhibit will also contain one of the motors for the 5-ton truck together with various parts of the car. In the 5-ton truck the motor is of entirely new design and has been constructed with extra bearing surfaces throughout, the design being such as to permit of removing the pistons from the cylinders without dismantling the engine. This is done by opening the doors in the side of the crankcase. Simms-Bosch high-tension magneto is fitted with a fixed spark. In order to protect the radiator from excessive vibration it is set in a steel case surrounded by felt, and the case is suspended on springs. Rubber connections are used between the radiator and the motor. The 2 and 3-ton trucks employ  $5\frac{1}{2}$  by 5 two-cylinder opposed motors and use magneto ignition.



**Studebaker**—One of the electric commercial vehicles of the Studebaker company is the 2,500-pound wagon with the undersprung battery and motors transmitted to the rear wheels through chains. The car is made with 111-inch wheelbase, 58-inch tread and 36-inch wheels with 4-inch solid rubber tires. The carrying space is 10 feet 6 inches by 3 feet 8 inches, and little siz, its introduction on the Locomobile Thirty, and its use battery equipment is forty cells with thirteen M. V. Exide battery.



AUTOCAR TWO-CYLINDER EXPRESS WAGON

KNOX  $1\frac{1}{4}$ -TON GASOLINE TRUCK



SEVERAL examples of the sump or crankcase reservoir system exist in the licensed ranks, among which can be noted Pierce, Knox, Chalmers-Detroit, Palmer & Singer, Columbia, Pope-Toledo and others. In two of these, Pierce and Palmer & Singer, splash lubrication within the crankcase is not used, the oil being fed direct to all bearing parts and no oil level maintained within the crankcase. In the other examples of sump lubrication the crankcase splash is used in conjunction with the feed to bearing parts. All agree in that the oil is circulated through the motor parts and again recirculated, being filtered once during each circuit.

In the Pierce system, Fig. 2 shows the leading characteristics, the oil supply being carried in the sump S beneath the crankcase and the crankcase bottom sloped towards the center so that oil falling in it is immediately drained into the sump. The gear pump P, driven from the camshaft through a vertical shaft, elevates the oil to a large tank T carried well above the cylinder heads and from this a lead L passes direct to each of the crankshaft bearings. From these bearings the oil passes through the drilled crankshaft to the lower bearings of the connecting rods, whence any overflow falls into the crankcase or is thrown into the cylinders in the form of a mist through the slot in the baffle plate, closing the lower end of the cylinder to prevent an excess of oil getting on the walls. This mist not only cares for the cylinder walls but also oils the wrist pin bearing. It is of interest in connection with the leads from the oil tank to the bearings that although the interior diameter of the leads L are all the same the oil does not flow through these at the full capacity of the leads but is regulated by thimbles M inserted in the upper ends of the leads where they enter the oil tank, and in each thimble is a small opening which allows only a limited amount of oil flowing. The size of the openings in the thimbles is varied in proportion to the quantity of oil needed, one bearing feeding more than another. In this system a few quarts of oil are poured into the oil tank if the system is empty, which in tests has proven sufficient for many miles.

On the small motors a wide space at the center of the piston is turned down to a slightly less diameter than the body of the piston, which prevents surplus oil reaching the combustion chamber. A paradoxical feature of the Pierce lubrication is the effort

made to prevent a surplus of oil getting past the piston into the combustion chamber. First to stop it the baffle plate is used, then the broad groove in the piston, and lastly the fact that a splash is not maintained and consequently a less quantity of oil than ordinary is splashed into the cylinder.

One of the great reasons for the adoption of the circulation system of lubrication is the simplicity it effects in the exterior of the motors. The many copper oil leads are eliminated, valuable space surrounding the motor is conserved and the motor is robbed of that complexity which hovers over it when the cylinders are encircled with multitudinous oil leads. With exterior oil leads there is the danger of breaking, due to vibration, a fact which was demonstrated on several occasions in connection with the Glidden tour of 1908. The many concerns retaining the external oiler have simplified it to a very great extent, first by reducing the number of feeds, and second by the branching system in which one lead from the sight feed subdivides into four or six branches when it reaches the several cylinders. Placing the lubricator on the motor arm close to the parts to be oiled has shortened the length of the leads and simplified the drive. The dash is the one part of the motor car that has profited most by the improvement of the lubricating system. The oiler has been taken from it and the bank of sight feeds reduced to one or two in a great many cases. Instead of placing these centrally they are often located at one end.



#### Winton's Double Pump Scheme

Winton six-cylinder motors are lubricated by a double pump scheme, Fig. 3, the pumps being driven by eccentric off the end of the crankshaft. One pump P draws the oil from a tank T by lead T1 and forces oil to all of the crankshaft bearings 1, 2, 3, 4 to the timing-gear case and a sight feed K on the dash, the oil going from the pump through one lead J to a distributing manifold M at the side of the motor. The other pump P1 delivers this oil back to the tank T, from which it was first drawn, thus permitting of the circulation and recirculation of the oil, with the usual filtering between successive circuits. In reality the main oil reservoir is located on the left side of the motor base. The surplus from the crankshaft bearings falls into the splash, which, instead of being allowed to increase, is drained off by a collector tube H to an oil well W, from which it is drawn by the pump P1 and returned to the tank T. With this system the crankcase is comparatively dry; the lower connecting rod bearings are oiled by drilling the crankshaft and the cylinder walls and upper wristpins by the splash from the overflow of the connecting rods and what oil may be picked up from the crankcase.



#### Royal Tourist Has Two Systems

Two entirely separate oiling systems are used on the Royal Tourist. In one a mechanical oiler A, Fig. 1, located beneath the dash, so its sight feeds can be seen where the dash joins the footboards, draws its supply from a 3-gallon tank T located under the front floor boards, and delivers it through leads A1, A2 and A3 to the three bearings B of the crankshaft. The crankcase has a horizontal partition forming an oil reservoir R and leaving the upper compartment C, into which the connecting rods dip in the oil level it carries. The oil level in compartment C is equalized by three transverse ribs R and the oil is pre-

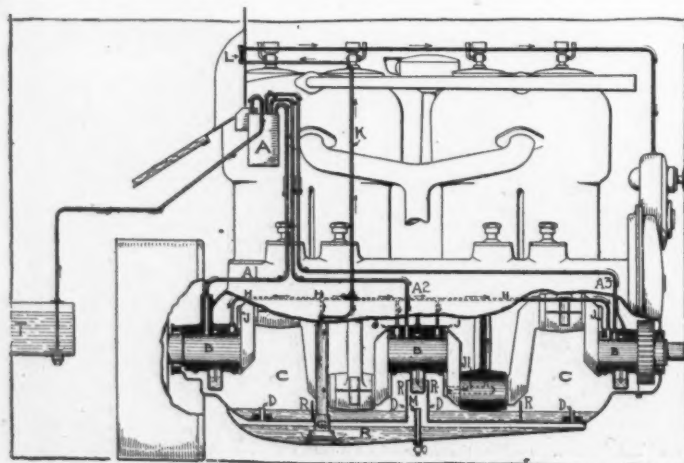


FIG. 1—ROYAL TOURIST LUBRICATING SYSTEM



vented from getting above a certain level by holes D in standpipes, through which the oil overflows into reservoir R. This is one system. In the second a small gear pump G in the reservoir R discharges upwards along its driveshaft to an oil lead H, which has a branch running to the inner end of each crankshaft bearing. By means of holes drilled in the bushings the oil is squirted into oil catches J, J, J, J that revolve with the crankshaft and feed the oil through holes J1, drilled in the crankpins to the lower connecting rod bearings. In addition the catches J receive the overflow oil which works from the main crankshaft bearings. From the gear pump a lead K passes through a sight feed on the dash and thence leads to the compartment housing the half-time gears at the front end of the motor. A ring is fitted on the bottom end of the piston to prevent an excess of the oil from the cylinders. In oiling the wristpins, which are tubular, the ends are plugged and the hollow thus formed receives oil from a recess cut in the outer wall of the piston at this point, which oil feeds to the bearing, which is in addition to oil pumped up through tubes in the connecting rods.



#### Mechanical Multi-Feed Systems

Of the many cars using a mechanical multi-feed oiler with its bank of pumps—one pump for each oil lead—much diversity exists as to where the oiler should be located and where the oil leads should pass. The old method of carrying the oiler on the dash, where it was at the mercy of the weather to thicken the oil on cold days and thin it on hot days, is almost obsolete. The majority place the oiler on the exhaust side of the motor, some set it on the rear motor arms, and Haynes and Stearns continue for the second season their policies of incorporating it in one of the forward motor arms, where it occupies very little room. Last year the Locomobile cars carried it under the floor boards at the left, but this season it is placed under the bonnet.



#### Knox Employs Simple Oiling System

On the Knox motors is a conventional pump system with the gear oil pump located outside of the sump on a vertical shaft at the right rear and driven by spiral gears from the camshaft, with the timer on the top of the shaft. The pump elevates oil into a horizontal passage cored in the top part of the crankcase, and from this are oil leads to each of the three crankshaft bearings. The oil does not overflow from these into the crankcase splash but first reaches the lower connecting rod bearings and later the wristpins. From the crankshaft bearings it is conducted to the lower connecting rods through the drilled crankshaft, which has a radial hole in the main bearing parts, which registers once each revolution with the oil lead from the pump. The connecting rods have a  $\frac{1}{4}$ -inch tube running the entire length to the wristpin, the bottom end of this tube registering with the hole in the crankpin through which the oil escapes from the drilled crankshaft. No oil grooves are employed at the bot-

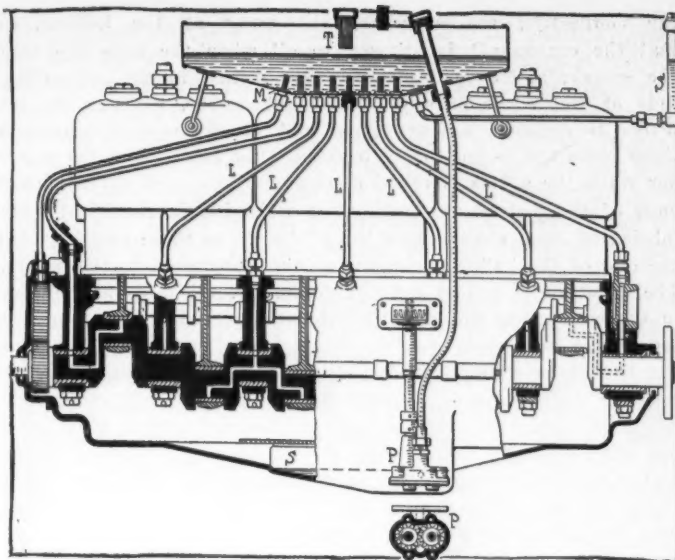


FIG. 2—PIERCE OILING ARRANGEMENT

tom of the piston, but a compression ring is fitted at this part of it. An oil pressure of from 2 to 4 pounds, varying with the different models, is used, which is claimed to be sufficient to force the oil to all of the cylinder motor bearings, and the mist from the overflow of which oils the cylinders. In conjunction with the oil pump system is an adjustable bypass controlled by spring pressure, which maintains the oil pressure at any fixed point between 1 and 6 pounds. This bypass as well as the oil leads to the connecting rods is provided with a small screen which guards against dirt entering, and a large fine-mesh screen has recently been added in the crankcase base, through which the oil strains before going to the pump. The use of baffle plates in the lower ends of the cylinders prevents an excess of oil reaching the walls.



#### Chalmers-Detroit System

The Chalmers-Detroit Forty as well as the Thirty employs the sump or crankcase oiling system, the only difference between the two being that in the Forty the gear oil pump is driven off the lower end of the timer shaft mounted vertically at the rear end of the motor, and in the Thirty it is driven off the rear end of the camshaft. In both models the oil is elevated from the sump or reservoir beneath the crankcase through oil leads to the crankshaft bearings, whence it overflows, maintaining a splash in the crankcase proper. In order to insure a goodly quantity of oil reaching the crankshaft bearings pockets are provided in the case above them, which are filled from the splash and from which the oil flows into and through the bearing. Two schemes are used for oiling the lower connecting rod bearings. First

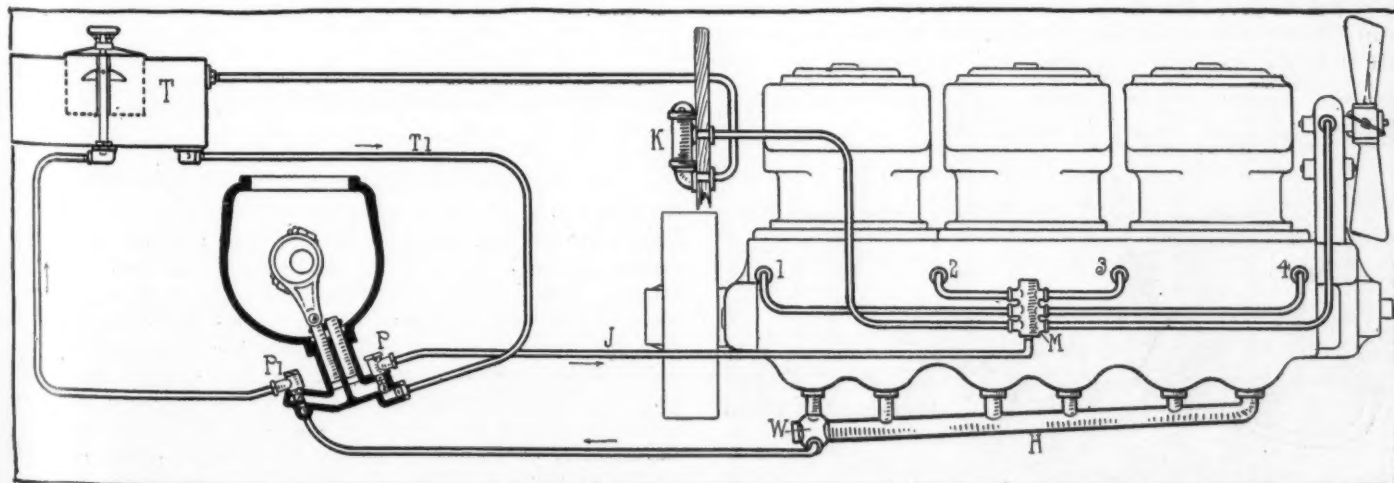


FIG. 3—WINTON'S NEW DOUBLE PUMP LUBRICATING MECHANISM

the connecting rod caps are cut away at the bottom, so that the crankshaft is exposed to oil when the caps dip into the splash; and second oil holes are drilled in the connecting rods at the lower ends parallel to the webs, so that the oil which is splashed against them and flows down them enters these holes and is led to the bearing. For lubricating the cylinder walls the splash is relied upon and oil grooves on the lower ends of the pistons are used. The wristpins in the Thirty are lubricated from the cylinder walls, the oil on these running into the end of the hollow wristpin, which is anchored to the piston. The wristpin is drilled radially to let the oil into the bearing in the connecting rod. In addition oil holes are drilled on the top of the connecting rod, which are filled from the splash. On the Forty the wristpin is gripped in the top of the connecting rod and has a bearing at each end in the piston boss, and to lubricate these the oil from the cylinder wall enters the hollow pin and is led by radial holes to the bearing surfaces. Baffle plates are not used over the open ends of the cylinders. As a check on the oiling system all of the lubricant pumped must pass through a constant stream sight feed on the dash visible to the driver, and should this flow cease it is instantly detected.

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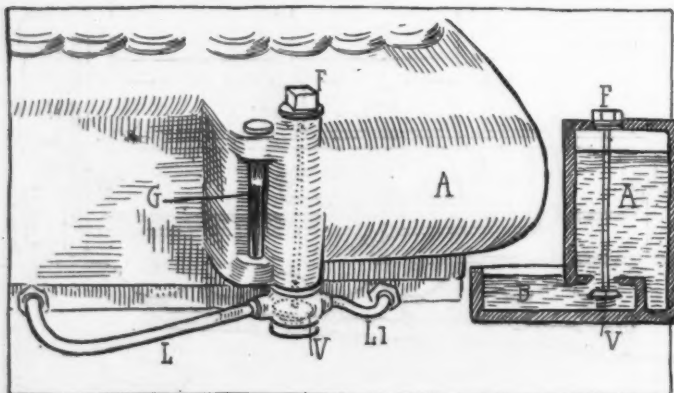
#### Haynes Uses Motor Arms

The Haynes system is typical of this mechanical multi-feed oiler class. The five-feed mechanical oiler is mechanically set in a case in the right front motor arm, and the left front motor arm is an additional oil well from which the oil flows through a duct cored in the crankcase to the oiler reservoir. Four oiler leads go to the cylinders and the fifth to the crankcase, the four to the cylinders delivering the oil directly against the pistons. The crankshaft is not drilled to oil the lower connecting rod bearings. Oil grooves are not cut in the pistons, but circular disks are used on the crankshaft, which throw the oil away from it, thereby increasing the splash. These disks are located at each end of the crankshaft just inside the case. The wristpins are oiled by splash and an extra ring is used on the pistons, which passes through grooves in the end of the wristpins. Baffle plates are not used.

✱ ✱

#### Pope-Toledo Gear Pump

The system used in the Columbia machines is almost identical with that of the Pope-Toledo, in which the crankcase, divided into halves, has a sump beneath, from which a gear pump elevates the oil to the two crankcase compartments, maintaining a level even with the tops of a standpipe in each through which all excess drains back into the oil sump. The gear pump used consists of one bronze and one steel gear driven through the commutator shaft, and the pump capacity is designed to give the quantity necessary for the motor. Owing to the crankshaft being carried on D.W.F. bearings the splash lubrication is sufficient. The lower connecting rod bearings are bronze alloy and they get their oil through circular disks carried on the crankshaft throws close to the ball bearings, and which disks pick up the oil in the crankcase as the connecting rod caps dip and throw



FIGS. 4 AND 4A—E-M-F AUTOMATIC MOTOR LUBRICATION

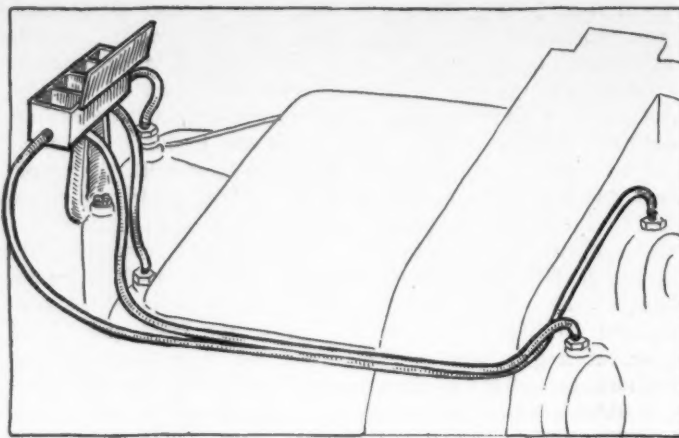


FIG. 5—PEERLESS GEAR BOX LUBRICATION

it by means of leads or gutters to the connecting rod bearings. The crankshaft is also drilled to provide oil to the lower connecting rod bearings. The wristpins are oiled entirely by splash; but in addition to the splash caring for the cylinder walls each piston has a groove on its inside at the bottom, which is filled from the splash and has radial holes through the piston walls, so that the oil flows through them against the cylinder wall. Baffle plates are not used.

✱ ✱

#### Apperson Simple Float System

The lubrication of the four and six-cylinder Apperson is an example of the simple float-feed type, with the Lavigne mechanical oiler carried on the motor arm and driven by a fiber gear above the magneto shaft. In the four-cylinder cars there are four oil leads, in the six there are six, and these leads go direct to the crankcase under the camshaft and maintain an oil level in the four compartments of the crankcase. In the six-cylinder cars there are six oil compartments. In these motors there is no drilling of the crankshafts for the lubrication of the lower connecting rod bearings, and baffle plates are not used, nor are oil grooves in the pistons. The wristpin anchored to the piston bosses is lubricated through an oil pocket in the top of the connecting rod from which the oil drains to the bearing. The Apperson system is an out-and-out splash one, and the role of the multi-feed mechanical oiler is simply to maintain a level in each of the four or six crankcase compartments.

✱ ✱

#### Methods to Prevent Leakage

Having dealt at some length on the analysis of the methods employed for lubricating the crankcase bearings, the upper and lower connecting rod bearings, and the cylinder walls, attention is next directed to the method of preventing leakage through the ends of the crankcase, the crankshaft bearings as well as at the gearbox and rear axle. In this work the stuffing box is the most popular, but is supplemented in many cars with what is known as the oil ring, being a ring formed integrally with the crankshaft. It is of inverted V contour, and the theory of its operation is that the speed of the periphery of this ring is considerably in excess of the speed of the crankshaft at its periphery. This increased speed is sufficient, due to the greater centrifugal force to throw the particles of oil which cling to the circumference of the ring into a V groove formed in the crankcase casting, and so prevents the oil working out past the end of the bearing. It is a simple device, based on sound engineering principles and is very efficacious. Some makers do not consider it sufficient, however, and in addition make use of the stuffing box or the leather washer. The stuffing box is in common usage and is of various compositions. In the Stearns cars it consists of hydraulic pressed flax which is contained in a threaded cap. The majority of makers realize that the greatest effort is placed to prevent leakage at the front end of the crankshaft, because leakage at the rear end is taken care of by the mud apron and



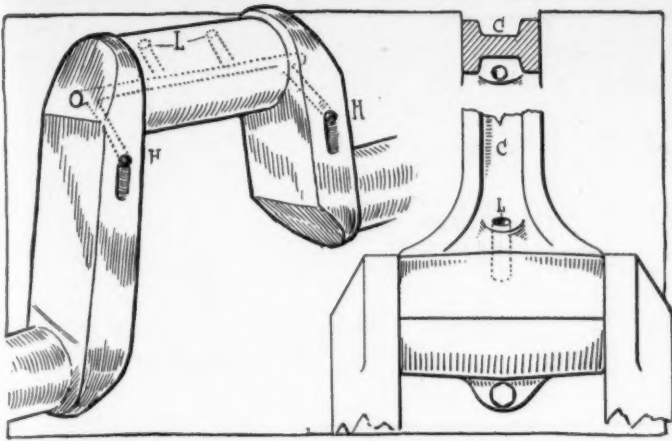


FIG. 6—LOCOMOBILE'S DRILLED CRANKSHAFT

FIG. 7—STEARNS DRILLED CONNECTING ROD

in the majority of cars there is at this point a considerable accumulation of mud and grease in the apron, which has been thrown off by the rotation of the flywheel.

#### Methods Used On the Stearns

The Stearns system includes a Lavigne oiler in the right front motor arm, from which a separate oil pipe leads to near the base of each cylinder, whether of the four or six type. On the lower ends of the connecting rods are forged lugs, which are machined out for an oil lead to force the oil to the crankshaft. In addition to this is an oil hole on the top of the bearing which is filled from splash. The wristpins are oiled solely by the splash system, there being a hole in the top of the connecting rod Fig. 7 to collect the splashed oil and a groove along the wristpin to distribute it throughout the length of the bearing. Oil grooves are turned in the piston at the lower end and a compression ring is used near the center of the piston. The crankshafts are not drilled and baffle plates are not used on the open ends of the cylinders.

In the small friction 15-30 town car a sump or reservoir system of lubrication is used, in which is a pump which elevates the oil and forces it in a constant flow on the connecting-rod bearings of the crankshaft. These connecting rods are I-beam section, but with the I-beam at right angles to the ordinary position; that is, parallel to the crankshaft. In the lower end is an oil hole upon which the oil feed spouts and the oil runs into the bearing. The I-beam position is changed so that it can form a channel for the oil to drain into the oil hole.

#### Locomobile Uses Splash System

In the Locomobile motors, the mechanical oiler is located under the hood and feeds direct to the crankshaft bearings. The ten bearings of the two camshafts are oiled by pockets over the bearings filled by the splash, and the lower connecting rod bearings get their quota of lubricant through the drilled crankshaft, as shown in Fig. 6, in which holes H are drilled in the crankshaft tubes and have drilled connections through the web and crankpin to the radial houses L leading to the bearing. Oil grooves are not cut in the piston, baffle plates are not made use of, and the wristpin is oiled from the cylinder wall, the oil flowing through it. This groove is always well filled from the splash, and when the piston reaches the bottom of the stroke, the oil in the groove enters the hollow wristpin at each end, and by the usual drilled holes reaches the bearing.

#### Automatic E-M-F System

The E-M-F lubrication is particularly unique in that it does not employ a mechanical multi-plunger pump or gear pump of any nature, the outfit consisting of an oil reservoir and a valve guarded door through which oil is allowed to pass to the front and back crankcase compartments in which it is kept at a predetermined level. Fig. 4 explains the principle diagrammatically: The oil reservoir A has an opening guarded by a valve V into the small compartment B. The valve V connects to the filling

cap F so that with the cap off to fill the oiler the valve V closes, not allowing oil to flow into chamber B, but immediately the cap F is tightened in place valve V opens. According to the laws of liquids and gases, with the valve V open the level of oil in reservoir A will tend to become the same as that in chamber B and, so, for supposition sake, let the oil stand in A at any level it will reach a level in chamber B, which is above the level of the valve V. There is a partial vacuum in A above the oil level which prevents further flowing through the valve V. As the level in chamber B lowers, reaching the valve opening, air bubbles will pass through into chamber A above the oil level and with the entry of each of them there will be oil pass into chamber B so that the level in B is maintained at a constant height. This will continue until the supply in A is exhausted. In the adaptation of this to the motor, A is the oil reservoir and V the chamber in communication with the crankcase compartments by large pipes. In Fig. 4 A is the reservoir formed integrally with the crankcase at the left rear, B is the chamber guarded by the valve and L and L1 the pipes to the crankcase. The crankcase is designed so that the oil level is not effected until more than a 38 per cent grade is encountered. The splash is depended upon to oil the cylinders, crankshaft bearings and wrist pins. Compression rings are used on the bottoms of the pistons to carry the oil over the cylinder walls, the crankshaft is drilled to oil the clutch bearing only and baffle plates are not used on the open ends of the cylinders.

#### Packard Two-Pump Scheme

The Packard system is unique because of its simplicity and individuality. In brief, it consists of two plunger pumps, P, Fig. 8, pumping oil by way of two sight feeds on the dash to the two crankcase compartments, one lead L to the forward compartment, the other, L1, to the rear compartment. These plunger pumps take their oil supply from a vertical cylindrical tank T located on the left side of the motor in the open angle between the front and rear cylinder castings, where the oil is maintained at a uniform temperature. The two pump plungers are driven from the left camshaft, and by thumbscrew M and lock nut N the length of stroke can be varied, permitting of the utmost regulation of the amount passing to each compartment, in which an independent oil level is maintained. In each crankcase compartment is a pet cock for determining the oil level.

#### Corbin Has Unique System

The Corbin system is a cross between the crankcase sump and the multi-mechanical oiler scheme. As illustrated in Fig. 10, oil is drawn from a cylindrical tank T carried at the left rear of the motor by a gear pump P at the left front of the motor through the lead L and is elevated through a single lead L1 to a bank of four sight feeds on the dash, from which it flows by gravity to the motor parts. This sight feed part consists of a header piece H on top into which all four glass feeds enter. The two center feeds C are small and lead to the crankcase compartments and the right end feed M is made large and connects with the cylin-

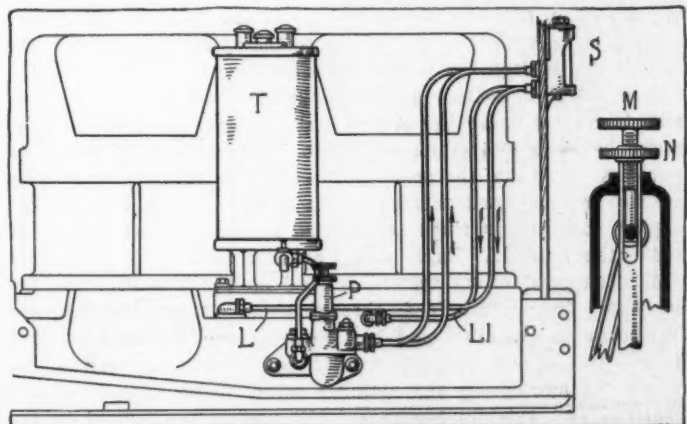


FIG. 8—PACKARD'S DOUBLE PUMP OILING SYSTEM

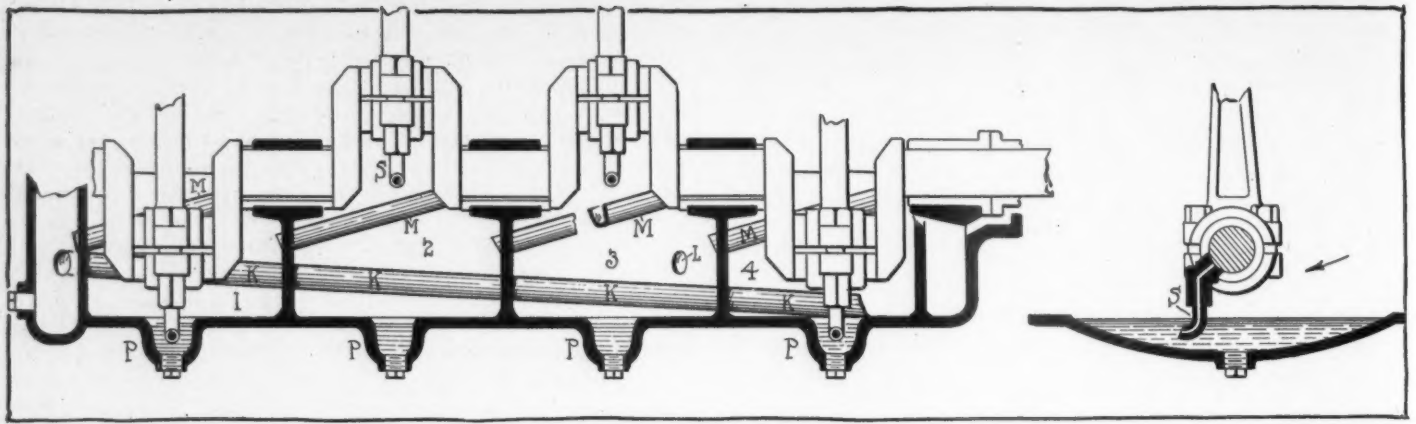


FIG. 9—CADILLAC'S PROGRESSIVE CRANKCASE TROUGH OILING ARRANGEMENT

der walls with a right-angled branch to each. Within the header piece H on the dash no particular distributing method is used to regulate the amount of oil passing through the leads C or M but the pressure of the pump P is such as to insure the requisite amount to each. Should a stoppage occur in the oil line a bypass channel B is provided in the pump casing in which a ball valve B1 is held seated by a coil spring and as soon as the oil pressure exceeds the tension of the spring the oil is bypassed around the pump instead of going through the lead L1 to the header H. From the header the flow is by gravity to the motor parts. The crankcase is divided into four compartments, 1 and 2 fed by one lead and 3 and 4 by the other with a small oil passage connecting 1 and 2 and another connecting 3 and 4. The crankshaft is drilled to lubricate the lower connecting rod bearings and the wristpins being hollow sufficient oil drains into them from the cylinder walls to care for them. Oil grooves are cut in the lower ends of the pistons but baffle plates are not resorted to. Pet cocks are used in the crankcase for determining the oil level.

#### Franklin Uses Mechanical Oiler

The mechanical oiler in the Franklin motor has separate leads to the crankcase compartments, in which are small oil pockets beneath each connecting rod in which an oil level is maintained. The crankshaft bearings, lower connecting rod bearings, and wristpin bearings as well as the cylinder walls are all oiled by splash. The crankshaft is not drilled, oil grooves are cut in the pistons, but baffle plates are used on the open ends of the cylinders to avoid too much oil splashing in them.

In the Peerless cars the oil reservoir is incorporated in the crankcase at the left side. The oil is pumped from the reservoir by a pump on the front of the dash driven by a flexible shaft, through four sight feeds on the dash, and thence to the four cylinders. In the four-cylinder motors the crankcase has two compartments and three in the six. In addition to this mechanical oiler, a hand pump is arranged whereby the oil can be injected direct into either crankcase compartment. The crankshaft is not drilled, but oil grooves are cut in the pistons, and by the use of hollow wristpins the oil fed to the cylinders finds its way to this pin through the piston bearings.

In the Stevens-Duryea motors, the multi-feed and mechanical oiler is carried under the bonnet and the leads run direct to the motor bearings and crankcase. The internal lubrication of the motor is by splash, the crankshaft not being drilled, but a compression ring is used at the bottom of the piston, whereas, the regular compression rings are located at the head of the piston above the wristpin. Baffle plates are not used.

A mechanical oiling system is used on the Thomas cars, the oil supply from which feeds through sights on the dash, whence it returns to the oiler, and is forced by another set of pumps direct to the bearings. Splash is depended upon within the motor for lubricating the cylinder walls, lower connecting rod bearings and wristpin bearings. Oil grooves are formed in the pistons and a broad groove made opposite the end of the wrist-

pin, which assists in lubricating it to the driver's satisfaction.

On the Simplex cars a conventional mechanical lubricating system supplying the oil level in the crankcase is used, the oil entering the cylinder sides so that its access to the wristpin is assured. Oil grooves are cut in the pistons and baffle plates used.

In the two-cycle Elmores the mechanical oiler forces the oil into the intake in the form of a spray, and the mixture passing through the crank chamber and thence into the combustion chamber lubricates all parts. In addition to this there is an oil lead to each of the crankshaft bearings. A compression ring is used near the bottom of the piston, and the wristpin has a cup in the forging which collects a supply of oil, which enters the bearings. There is also an accumulation of oil in the crankcase and the cap on the connecting rod, which dips into it, is provided with a scoop which gathers the oil.

#### Cadillac System Very Novel

A mechanical oiler is used on Cadillac Thirty cars which is a complete unit within itself. The oiler attaches to the side of the crankcase and is driven with worm and gear located in the reservoir and which in turn operate a double-ended plunger pump, one end of which takes the oil from the reservoir and sends it to sight feeds on the dash, and the other, which is slightly larger and has a greater displacement, takes it from these sight feeds and delivers it to compartment three, Fig. 9, of the motor base. Once in the motor base it just fills small pockets P, into which the connecting rods dip, and is picked up by little tubular spoons which project from the ends of the connecting rods and through which the oil feeds to the lower connecting rod bearings. These spoons also splash oil into the cylinder, which fills pockets above the wristpins, whence it oils them. As the oil runs down out of the cylinder onto the crankcase walls it is caught by a trough M on the wall, which carries the oil to the next crankcase compartment 2 and in this way it is transferred from compartment 2 and thence to compartment 1, whence it flows back to compartment 4 through a large pipe K. From this compartment it starts again by way of trough M on another circuit. A part of the oil as it runs down the walls of the crankcase is led through channels to the five bearings of the crankshaft, the oil flowing through each being much in excess of that needed. The crankshaft is not drilled, but one oil groove is cut in the pistons in the plane of the wristpin, the oil collected in this groove flowing through the piston into the wristpin bearing.

#### Method Used on White Steamers

In the White steam cars an oiler is located on the dash, which is driven by means of a ratchet from the valve mechanism on the engine. This oiler consists of two independent reservoirs, each supplied with a pump. One of them feeds into the crankcase, and the other into the steam chest. The oil entering the steam chest is carried along by the steam through the engine, being deposited not only on the walls of the two cylinders, but on the valves as well. Any excess oil is carried through into the condenser with



the exhaust steam and is returned to the water tank where it may be fluffed off when filling the tank with water. The crankshaft bearings are of the ball type and are lubricated by the splash system, as are the cross head pins.



#### To Prevent Leakage From Gearbox

But the leakage of oil from the crankcase of a motor is only one of the parts from which it may escape. It frequently happens that the gearboxes and rear axles are equally great offenders. The gearbox in which the main and countershaft are located in the same horizontal plane are not so susceptible of leakage as those in which the shafts are located in the same vertical plane. In the latter case the lower shaft is often partially submerged and there is an ever-present opportunity for the oil to work out. The majority of makers have largely overcome this by using a one-piece gearbox with end plates to take the bearings for the shafts. The end plates can be made comparatively small so that threaded caps with felt washers or stuffing boxes practically eliminate leakage. Leakage from the rear axle is more serious, in fact many cases are on record where it has proven exceedingly serious. The danger of oil or grease leaking from the back axle is that the oil reaches the brakes and greatly reduces their efficiency. In fact, cases are on record where brakes have become entirely inoperative because of grease leaking from the rear axle housing.

But the objection of grease leaking from the rear axle reaching the brakes is not the only one; there is the other one of it getting on the wheel and forming an excellent receptacle for dust. Still worse, it reaches the tires and is exceedingly destructive to them. To go further, it is thrown on the body work and is exceedingly destructive of the finish.



#### Various Methods Enumerated

Although a complete enumeration of the methods employed by several of the licensed manufacturers to prevent leakage may be cumbersome and monotonous to some, it may prove of interest to others making a critical analysis of the field and is as follows: The Stearns employs a stuffing box at the front and a felt packing at the flywheel end. On Thomas cars the oil ring on the shaft is made use of at either end. A similar policy is adopted by the Haynes company on its 1909 model. The six-cylinder Wintons make use of felt washers to prevent leakage at each end of the crankshaft. On the Royal Tourists stuffing boxes are fitted on both ends of the crankshaft, at the magneto coupling, and also for the valve plungers. Stevens-Duryea crankcases are constructed with the lower half so designed that leakage which might occur, drains back into the interior of the case. A stuffing box is employed on the front end of the Peerless crankcases and on the rear end a hollow ring, which throws off the oil by centrifugal force, and a duct is provided to drain this oil back into the crankcase. Felt washers are provided on the Franklin cars. A felt washer is fitted at one end of the Cadillac

crankshaft and at the other the oil ring, running in the groove, from which a return duct leads into the crankcase. Felt washers are fitted at both ends of the Corbin crankshaft. On the Columbia machines a felt packing does service at the forward end and at the rear end a ring is fitted outside of the bearing which throws the oil off into a groove whence it drains back into the case. On Pierce cars the oil groove is fitted with provision made for returning the oil to the crankcase. Knox cars are fitted with a 4-inch felt washer  $\frac{1}{4}$  inch thick at the flywheel end, and on the forward end has the oil ring fitted. On the bottom of the front plate of the crankshaft gear piece is formed a circular pot to catch oil which might pass the end of the bearing. On the Chalmers Thirties and Forties the integral oil groove is used at the front ends, and at the rear end on the Forty. But on the rear end of the Thirty, because of the use of annular ball bearings, a spun brass collar is inserted, which prevents oil passing from the crankcase to the flywheel case, or vice versa. A return pocket is provided on the E-M-F cars to prevent oil exuding from the crankshaft end. On the Locomobile crankshaft the ring oil thrower is employed, and at the front end additional precautions are provided in the form of two stuffing boxes. The leakage of oil is guarded against in the Elmore cars by the use of long bearings. Oil-slinging rings are used on the Simplex cars. In the Pope-Toledo motor large felt washers are used.



#### Preventing Crankcase Leakage

In a brief resume of the various methods used to prevent leakage from the gearbox and axles, the following information appears: On Chalmers-Detroit cars felt washers are used in the transmission, these being mounted in bronze retainers, which method is also used at either end of the rear axle. In addition to being used between the rear axle housing and its cover. Felt washers are used on the Pierce gearbox and at the front end where the danger of leakage is greater, owing to the gears being in constant mesh, a steel plate is positioned to deflect the grease and in addition two felt washers are held in position by the plates. Felt washers are also used on the rear axle. On the Columbia cars, where the mainshaft extends through the gearbox, felt packing is used. On the Corbin cars felt washers are used on the transmission case and steel and felt washers on the rear axle. A series of compressed felt washers contained in a steel thimble is employed in the Cadillac car to prevent leakage from the universal joint housing. Felt washers do service for the gearbox and transmission in Franklin cars. Stuffing boxes are relied upon in Peerless machines. In the Stevens-Duryea cars gaskets are employed, and the construction of the rear axle is claimed to be such as to practically form a baffle plate for the prevention of leakage. The escape of heavy oil used in the rear axle of the Royal Tourist is prevented by inserting grooves and compressed felt washers. In the gearbox of this car the countershaft is carried beneath the mainshaft.

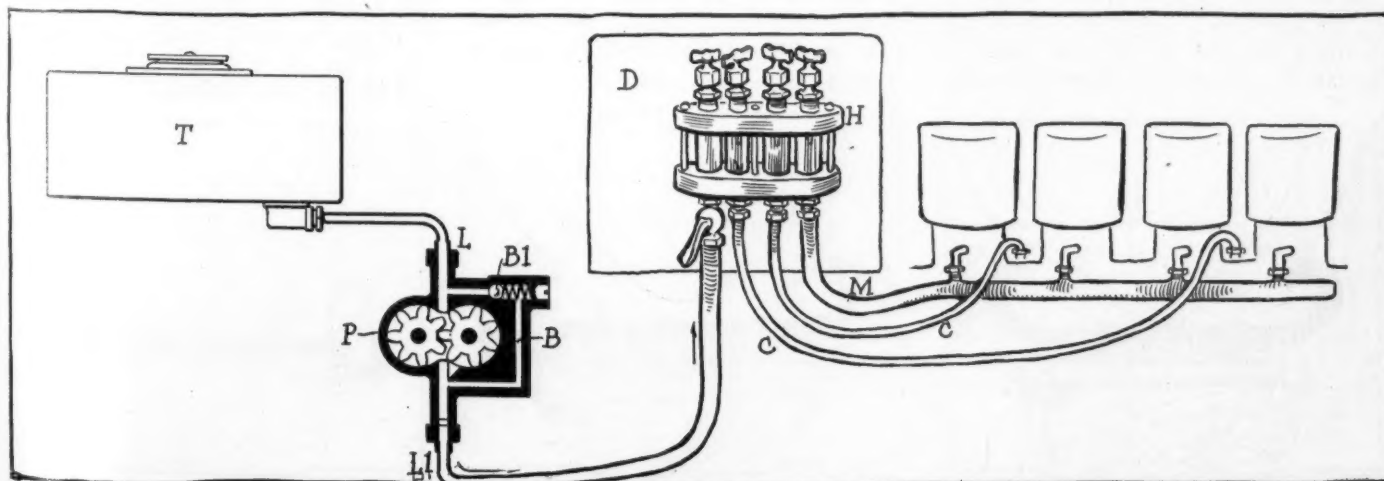


FIG. 10—DIAGRAM OF CORBIN'S GEAR PUMP AND GRAVITY SYSTEM OF MOTOR OILING

# The Accessories

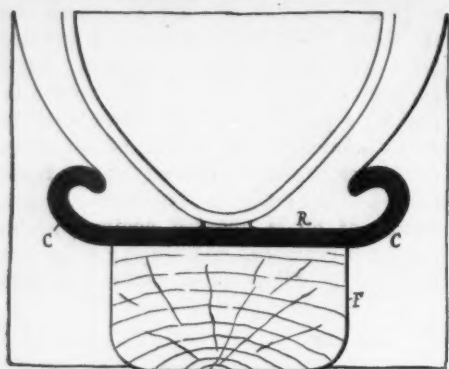


FIG. 1—CLINCHER RIM

MUCH confusion exists in the average motorist's mind as to the exact meaning of demountable rim and quick-detachable tire as well as with the third combination, the quick-detachable demountable rim. A demountable rim is one in which the entire rim carrying the tire, together with the tire, comes off; a quick-detachable is one in which only one ring of the rim holding the tire comes off and after it is removed the tire may be pulled off with ease, the rim itself remaining firm on the wheel felloe. In the quick-detachable demountable the rim and tire come off in case of a puncture and an extra rim with tire fitted and inflated, as in any demountable, fitted in addition the demountable rim has a quick-detachable ring to enable rapid changing of the deflated tire on the rim off the wheel.

#### Features of Demountable Rim

In contrast with these is the demountable rim Fig. 3 where the clincher rim R carries two permanent clincher rings and to the inner side is riveted a series of lugs L which are held to the wheel felloe by as many transverse bolts B passing through

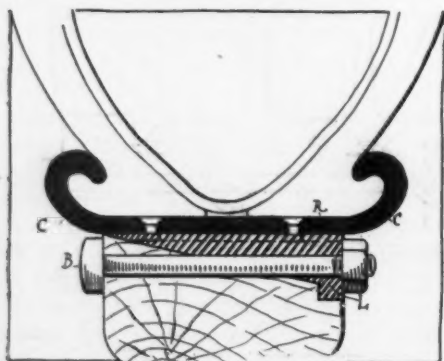
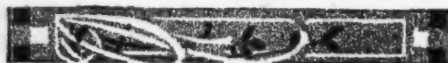


FIG. 3—DEMOUNTABLE RIM

## Quick-Detachables



the felloe so that removing the nuts on the bolts allows of pulling the rim R with its tire off the felloe in direction of the arrow A in case of a puncture or blowout and after which a new rim with tire attached already and inflated is positioned.

Lastly in Fig. 4 is the quick-detachable demountable in which the rim R carries one permanent ring CF and a quick-detachable ring QD, and in addition the entire rim may be removed from the wheel felloe as in Fig. 3 by removing the nuts from the ends of the bolts B which hold the rim to the felloe.

#### Universal Rings On Quick-Detachables

But quick-detachable rings are sometimes reversible as the universal ring illustrated in Fig. 5 which rim will take clincher tires or Dunlop type tires. In this rim the real rim part R is a flat band with a groove G at one side and a small bead B at the inside side. Against the bead B bears a reversible ring R and at the other side is a similar removable ring bearing up a locking-ring LR which snaps into the groove G and is held therein by its own spring tension. In Fig. 5 the convexed sides of the rings C are inward to take the Dunlop type of tire; but in Fig. 6 appears this same rim with the removable rings C turned oppositely—their concaved faces opposite to each other giving the same effect as a clincher rim and suitable for taking a clincher tire. It is this ability of turning the rings C to take either a Dunlop or clincher type tire that has obtained for it the name of universal rim.

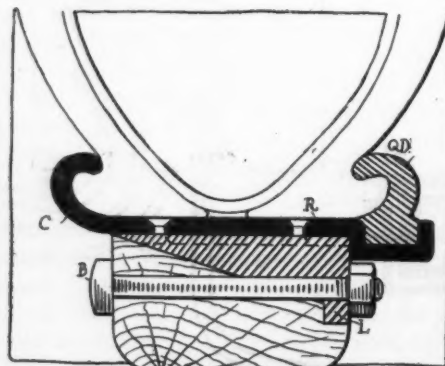


FIG. 4—DEMOUNTABLE-DETACHABLE

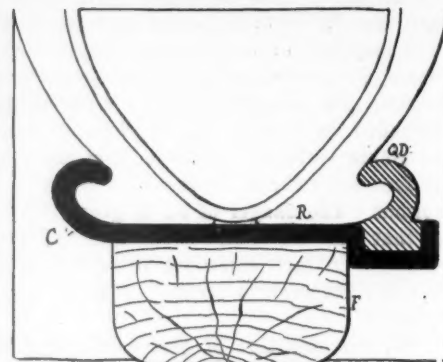


FIG. 2—QUICK DETACHABLE RING

Having thus briefly outlined the quick-detachable field a brief resumé of the different quick-detachable rings, or flanges, as many makers prefer to call them, will be in order. If properly named these should not be called quick-detachable rims, but quick-detachable rings.

#### Clincher Rim Illustrated

In Fig. 1 is illustrated the simple clincher rim with the two clincher rings C integral with the rim proper R and the complete unit shrunk onto the wood felloe F of the wheel. In Fig. 2 is shown the simplest form of quick-detachable in which the rim R carries a permanent integral clincher ring C on one side and a quick-detachable ring or flange QD on the other side, which rim may be attached in any one of a variety of means; the big feature being that this flange can be removed, after which the tire will slip off with ease, allowing of a new tire being put on, after which the QD ring is positioned and the tire inflated.

#### Goodrich Quick-Detachable

In the Goodrich quick-detachable ring Fig. 7 the rim R carries a permanent ring PR on the inner side and the removable

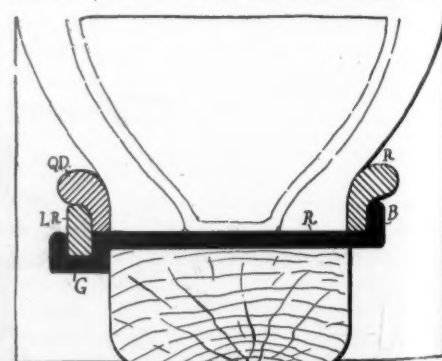


FIG. 5—UNIVERSAL DETACHABLE FOR DUNLOPS



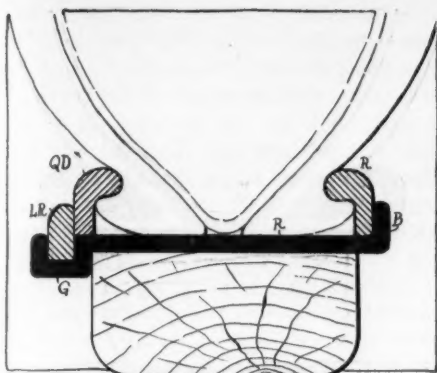


FIG. 6—UNIVERSAL DETACHABLE, CLINCHERS

ring QD is a split clincher ring. For the purpose of attaching this to the rim R it has a hook H at each end which enters a slot S of the permanent rim. Once sprung into these slots as well as resting in a groove G on the rim the quick-detachable ring is rigidly positioned, the pins P on the rim entering the holes P1 in the quick-detachable ring to prevent creeping. A special tool is provided to remove this ring QD by means of which one end is freed from the slot S after which this end is removed from the groove and the tool handle slipped around the circumference of the rim and the ring sprung off, with the exception of the last hooked end which can be lifted out readily. This rim is only made for clincher type tires.

The Marsh rim manufactured and controlled by the the Diamond company as shown in Fig. 8 differs somewhat from the Goodrich. The quick-detachable ring QD is a one-piece one with its tire side contour resembling a clincher lip. The rim R has an inverted lip E extending in the direction of the wheel hub at the outside. A locking split ring LR is made with a U-shaped part to embrace and fit snugly around the lip E while the upper part of it rests against the straight edge of the detachable ring QD. The spring tension in the locking-ring LR would hold it in place; centrifugal force would also tend to hold it in position, but in addition a locking piece B is used which fits between the ends of the detachable ring LR, holding them apart, and in turn receives the bolt B1 and is held thereon by nut. In removing this quick-detachable, this nut is taken off, followed by a removal of the locking piece,

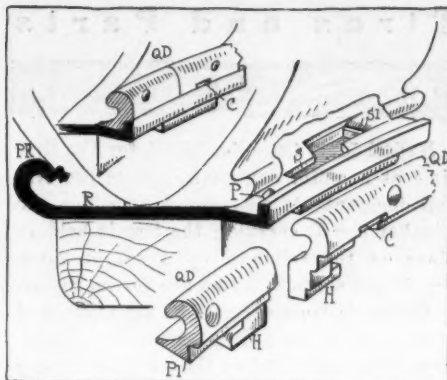


FIG. 7—GOODRICH Q-D RING

after which the locking-ring is sprung out and the ring QD pulled off. This rim is for clincher type tires only.

#### Goodyear Quick-Detachable

In the Goodyear universal quick-detachable Fig. 9 the rim R carries a groove G at the outside and a small upturned bead B at the inside. One of the universal ring R rests against the bead B and the other against a split snap locking-ring LR which rests in the groove G. One end of this ring carries a right-angled hook H fitting in a hole in the rim and the other end has a small setting stud. In attaching the locking-ring the hook H is positioned and the ring then forced into the groove. With the universal ring R turned as in Fig. 9 the rim is ready to take the Dunlop type tire, with them reversed the clincher type of tire may be used.

#### Standard Universal

The universal quick-detachable rim now used by Morgan & Wright, G & J and

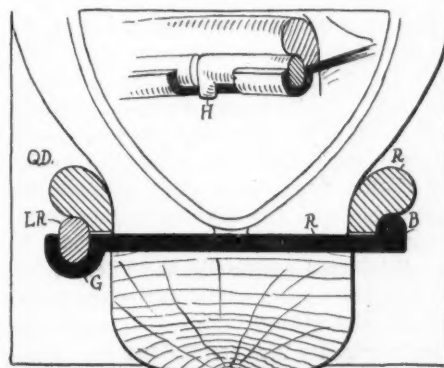


FIG. 9—GOODYEAR QUICK-DETACHABLE

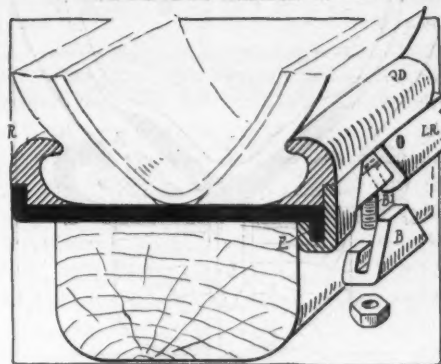


FIG. 8—DIAMOND COMPANY'S MARSH RIM

Hartford as its name implies may be used for clincher or Dunlop type tires and is very similar to the Goodyear. Fig. 10A shows it arranged for Dunlop type tires. This design has the ring R with a permanent clincher ring PC on the inside and a groove at the outside. The quick-detachable ring QD is held in place by a locking-ring LR which is provided with a hood H on one end for anchoring the rim R, whereas the other end is held in place by the spring of the ring. In the permanent clincher ring a rubber bead RB is placed to give the Dunlop type of ring R. When the clincher tire is used this bead is left off and the QD ring is reversed as shown in Fig. 10B.

#### Firestone Quick-Detachable

By the Firestone quick-detachable ring Fig. 11 the rim R carries a bead B at one side, a groove G at the other and the QD ring has two pins P which enter holes P1 in the ends of the locking-ring LR, the locking-ring as in the other types of this class resting in the groove G. In attaching this quick-detachable the ring QD is crowded in against the tire and one end of the locking-ring is placed in the groove so that its hole P1 is directly in front of the right pin P. The remainder of the ring is put in place; the ends of the locking ring are then brought together with the tool provided and the pins P enter the holes P1. A slot C is provided to insert the tool to pry the locking-ring out of the groove when removing it.

But the designing and manufacturing of a quick-detachable ring is one thing; and the manufacturing of a tire suitable for use on them is another problem. With the

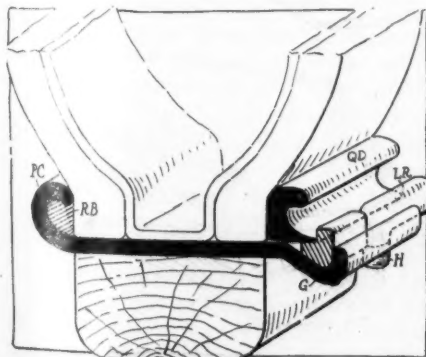


FIG. 10A—UNIVERSAL Q-D FOR DUNLOPS

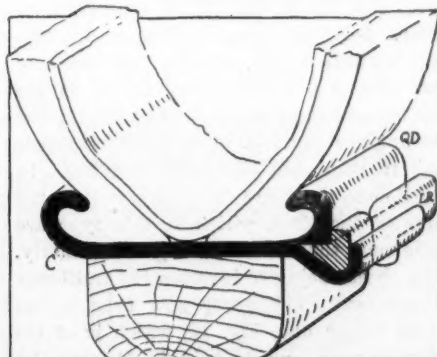


FIG. 10B—UNIVERSAL Q-D FOR CLINCHERS

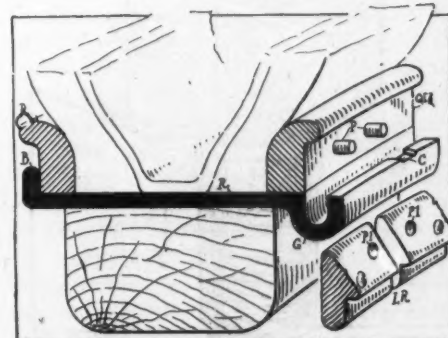


FIG. 11—FIRESTONE QUICK-DETACHABLE

## Tires and Parts

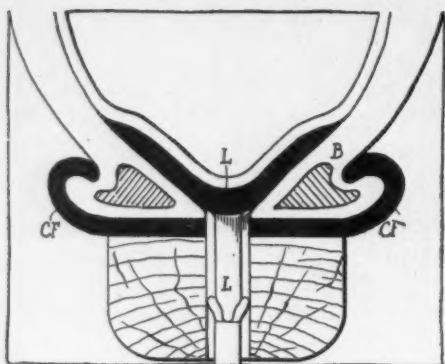


FIG. 12—ORDINARY CLINCHER RIM

ordinary clincher rim Fig. 12 the beads B are flexible and extensible to allow of their being pushed over the integral clincher ring C in removing the tire. To insure the tire not coming off lugs L are placed at regular intervals around the wheel circumference, some taking four, others five and others six. In the quick-detachable ring rim the lug is entirely dispensed with but a flap F Fig. 13 is generally used to prevent the air tube getting between the tire beads and becoming pinched. Still further the beads B are much harder so that they cannot stretch and roll over the integral clincher and quick-detachable rings, this being imperative because of the absence of lugs. This fact is not generally understood by many car owners who do not realize that nearly all of the makers build what they call a quick-detachable tire, namely a tire with a hard bead whereas their standard clincher tire has a non-extensible bead. In some makes the bead is formed of strands of fabric which make a pliable bead or one that will bend but will not stretch. Other makers use a hard rubber core in the bead. In the quick-detachable Dunlop type tires the bead is generally made with wires or cable within it which makes stretching impossible.

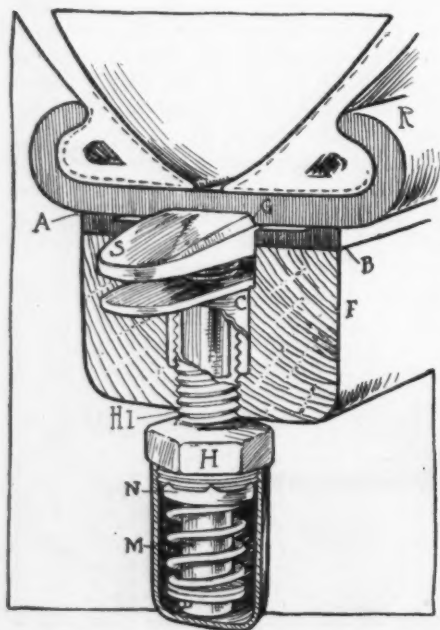


FIG. 15—NADALL DEMOUNTABLE RIM



Nadall Mfg. Co.—Exhibited for the first time at a motor car exhibition is the Nadall demountable rim, Fig. 5, in which the clincher rim R carrying the tire is held in place on the felloe F by a set of three arc-shaped shoes S, which are forced radially outwards from recesses in the felloe and anchor in recesses G in the clincher rim. The illustration shows the shoe anchoring the rim in place. Before removing the rim, the nut H, which is a part of a hollow threaded sleeve, is rotated, lowering the shoe S, in that the thread H1 works in the internally-threaded socket C. Each of the shoes S is a cold-rolled steel member 3 inches in length measured circumferentially, 1/2 inch in radial depth and 1 inch wide. The curvature of the shoe S is of the same radius as that of the recess G, which is greater than that of the inside of the

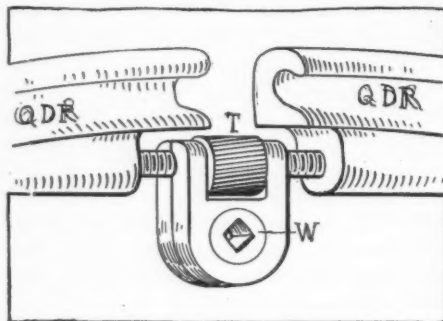


FIG. 14—MIDGLEY Q-D RING

clincher rim R, the result being an anchorage between the shoe and the clincher rim, which does not tend to break the clincher. In addition, the shoe S has its edges beveled to 20 degrees, so that as it enters the recess G it presses radially upwards and to the side. A ratchet wrench is used for working the nut H. Rims with quick-detachable rings can be used on this demountable with the same facility as regular clinchers. The three locking shoes S are distributed practically at 90 degree intervals, there being radial anchorage studs at the valve stem.

Motz Clincher Tire and Rubber Co.—Two new solid rubber tires are marketed by this concern for the coming season. One of these, Fig. 16, is the special long-distance electric designed along the line of the company's cushion tire, except that the concave groove C in the tread is cut deeper and in each half of the tread so formed are angular slots S intended to increase road traction and eliminate skidding. In addition to these are indentations D in the sides of the tires, which in this type are made more than twice as large as formerly, their object being to increase the resiliency of the tire. The other new type is the motor buggy one, Fig. 16, which is of the clincher type and is held in the rim by steel cross bars K placed slantwise in the

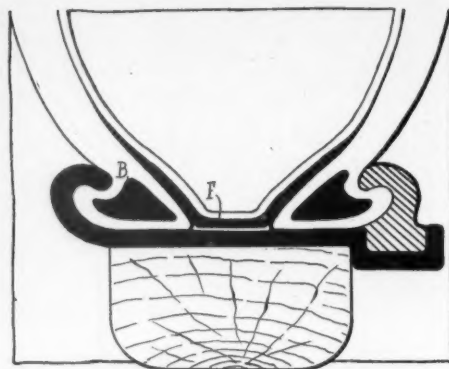


FIG. 13—QUICK-DETECTABLE RING TIRE

base of the tire, the ends of the bars extending under the lips of the clincher rim.

Voorhees Rubber Mfg. Co.—The Voorhees company hints at a surprise for the New York show in the way of a device which will do away with the necessity of carrying a spare tire. It all depends whether or not it can get out the mold in time, so until the show opens it is a question just what will be shown. The company at any rate will exhibit its line of vulcanizers.

Trenton Rubber Mfg. Co.—An absolutely new line of goods for this company is its tire casings shown for the first time and manufactured in standard sizes. These goods have been on the market for 6 months. In addition to these leather goods Thermoid brake lining, floor coverings, tubing, bumpers, inner tubes, matting and other similar requisites are handled.

Firestone Tire and Rubber Co.—The new Firestone demountable rim may be used in connection with standard clincher rims or rims with quick-detachable rings. The clincher rim carrying the tire has pieces secured to its inner surface which rest upon the wheel felloe to prevent rusting. This rim slips over the felloe and is secured thereon by a locking ring, which is in turn held in place by metal pieces secured to the felloe by cross bolts.

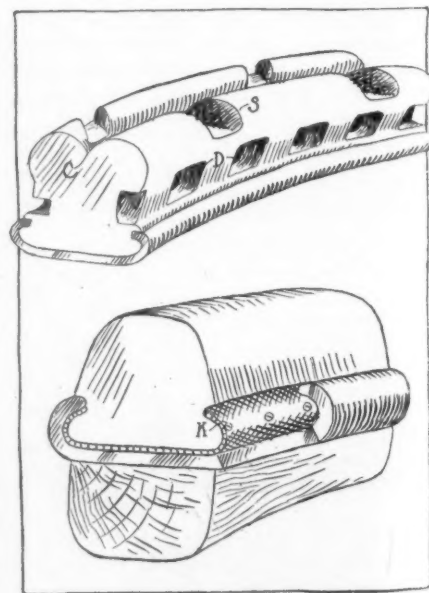


FIG. 16—MOTZ RUBBER TIRES



**O. A. Brietson**—The Brietson detachable tire tread, Fig. 17, is a combination leather and canvas covering C, entirely enclosing the outer casing and extending within the lips of the clincher rim, by which means it is held in place. The tread of this protector consists of many thicknesses and carries steel studs S to prevent skidding. At the sides are oval headed rivets R to prevent wear of the tire in ruts on the road. Although illustrated for use in conjunction with clincher tires, it is manufactured for use on Dunlop types as well.

**Atlas Rubber Co.**—This company markets an inner case for pneumatic tires, which is inserted between the regular outer tire casing and the inner tube. As illustrated in Fig. 20, this inner case has a series of metal disks D arranged in a cushion of rubber, which prevents puncturing and which is the feature of the device. The fabric ends at the point E and F marks the combination rubber fabric construc-

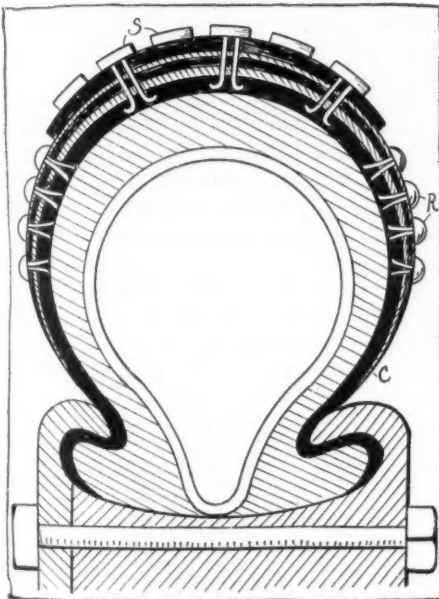


FIG. 17—BRIETSON TIRE TREAD

tion of this inner case. The claim is made in conjunction with this inner case that its manufacture is such that additional heat is not generated by its presence. This inner case is not vulcanized to the outer casing, but may be removed with facility and used in any other tire of the same size without cementing or vulcanizing.

**Goodrich Truck Tire**—The B. F. Goodrich Co. has brought out a wireless motor truck tire manufactured in either single or dual type, the single type being illustrated Fig. 19. This tire consists of three factors; a special steel base X, with dove-tailed grooves on the top surface, a hard rubber base V which dove-tails into the steel part and a soft rubber tread U vulcanized on the hard rubber sub-base. The tire is held in place on the felloe of the band by means of lugs Y on either side of the steel base, and a key on the felloe band which fits into a key seat on the steel

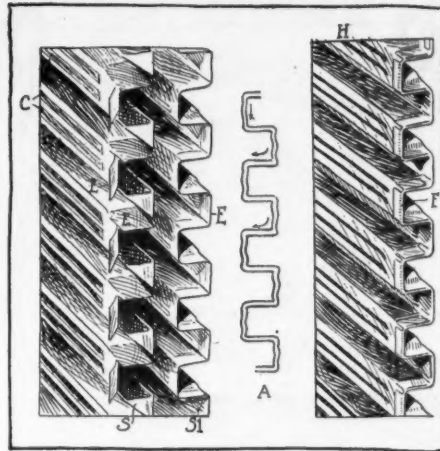


FIG. 18—LIVINGSTONE RADIATOR

base of the tire and prevents circumferential movement. By this arrangement the fastening point of this wireless tire is steel-to-steel. The claimed advantage in this new tire is increased mileage because it affords a maximum external abrasion without affecting its fastening to the wheel. The tire is made in prevailing standard sizes. In the dual type the simplified method of attaching allows of placing the two tires in direct contact with each other, thereby reducing the width of the tread over all without lessening the actual tire surface.

**Auto Pump Co.**—The Spencer power air pump and the new combination oil and grease gun will be the features of this exhibit which also will include an electric tank gauge. The Spencer pump is really two powerful pumps combined in one, it being possible in an emergency to use either cylinder independent of the other. It is used for inflating tires, and secures its power direct from the end of the engine shaft. The electric tank gauge is located on the dash and shows the amount of gasoline in the tank day or night.

**Hopewell Brothers**—This company's line includes its standard tire cases, lamp covers, motor vests, etc. The company has specially designed for western trade the Kinder tire case. The regular lamp covers are made to order to fit certain standard types of lamps and are manufactured from leather-grained rubber cloth, fleece lined.

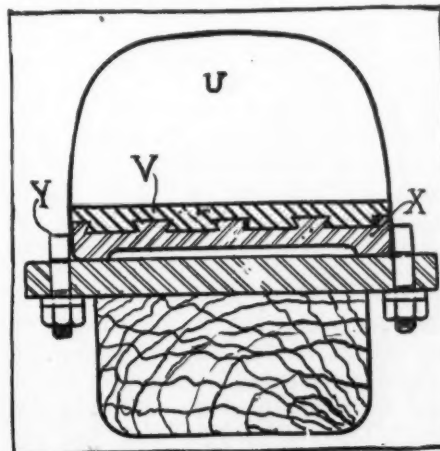


FIG. 19—GOODRICH TRUCK TIRE

## The Radiators



**A-Z Co.**—A new departure in this company's line of radiators is its A-Z bulge square seamless tube type, supported on ball trunnions at either side. In addition to this its regular line includes various designs of hood, tool boxes, mud guards, metal dashes and runabout bodies as well as copper tanks. Also there are novelties in metal trunks, hampers, brackets and special fittings. The A-Z muffler with automatic cut-out and the felt-joint mud apron can be included.

**Livingston Radiator Co.**—The construction of the Livingston square tube radiator is illustrated in Fig. 18. The water follows a zigzag course from top to bottom, as illustrated at A in the central part of the illustration. The method of forming each

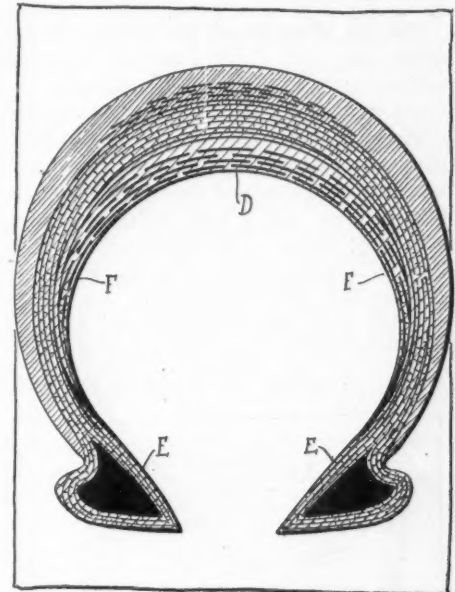


FIG. 20—ATLAS TUBE PROTECTOR

zigzag channel consists in putting together two corrugated sheets S and S1, the piece S having the ends E designed to fold over the parts E of the opposite sheet, as shown at F in the right part of the illustration. The corrugations C allow for expansion. After crimping the folded ends at F they are soldered and the radiator assembly consists in banking together the requisite number of vertical zigzag water passages, as represented in the section A. In this radiator, for each square foot of frontal area with a radiator 4 inches in depth from front to rear, there are 56 square feet of radiating surface, and where the tubes measure 3 inches from front to rear there is 33½ square feet of radiating surface for each frontal foot. In estimating the necessary size of its radiator the company allows 4 square feet of radiating surface for each horsepower of touring cars, when fan and pump are used, and 7 square feet where thermo-syphon is employed.

## Body Accessories



**Pierson Motor Supply Co.**—Three specialties will be exhibited by this concern, one of which will be the Williams folding wind shield, Fig. 27, which is of the rectangular class, having the upper half hinged to the lower, and when in the up position is held by a hook H attached to the top half and anchoring under a hooked piece K on the lower half, a spring holding the hook in a catch in the piece K. When lowered the hook K anchors in a special catch K1 at the base of the lower half. The second accessory is the Wayne portable gasoline tank and pump for garage use. It has a 50-gallon capacity and is mounted on large side wheels and a small pivoted front or guiding wheel. The pump discharges  $\frac{1}{8}$  gallon,  $\frac{1}{2}$  gallon or quart at each stroke.

**Chicago Wind Shield Co.**—The 1909 addition to this concern's line of wind shields is its Dixie, made throughout with brass tubing, which contracts significantly with the previous frames used on this company's shields. The corners are reinforced with corner plates and the shield is of the hinged type, being held in the up position, Fig. 25, by a thumbscrew TS, entering the upper slot of a bracket P on the end of the frame. When in the folded position this same thumbscrew entering the lower slot S locks the frame securely. The company also has a new zigzag road-

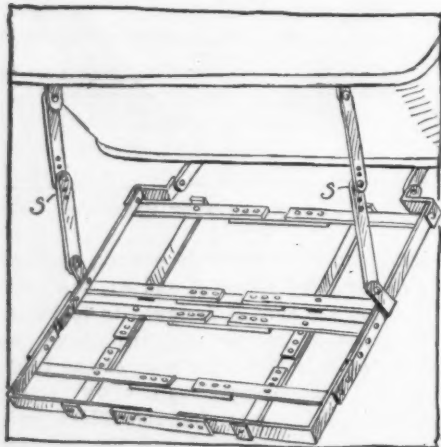


FIG. 21—NOONAN TRUNK RACK

ster shield, Fig. 24, which uses the vertical brace rods R extending to the ends of the footboard instead of the forward brace rods alongside of the bonnet. The shield is of the one-glass type and folds through the two-part hinge H, together with the thumbscrew TS, which locks the hinge in any position. When folded the glass lies close upon the horizontal wood part. In addition to its wind shields the company furnishes cross links for tire chains, illustrated in Fig. 22. These are copper-plated chains with hook ends which snap in the regulation side chain. Another ad-

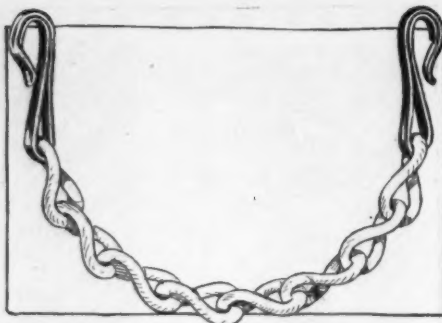


FIG. 22—CHICAGO TIRE CHAIN

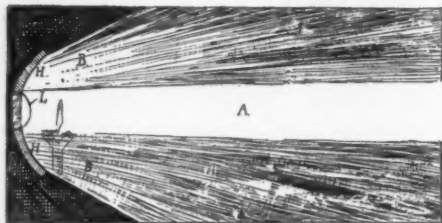


FIG. 23—MANHATTAN DOUBLE-FOCUS REFLECTOR

dition is the Perretz lighter, which is a combination of electric repair lamp, acetylene lamp lighter and cigar lighter. When the lamp bulb is unscrewed from the socket it can be used for lighting lamps or other purposes by a short length of cotton and wire which is treated to a white heat. The lighter is a small yet very handy device and should meet with general adoption because of this.

**Chandler Co.**—Name plates of every description—sill, radiator, hub cap or cutout—will be shown along with a line of samples and various articles manufactured by the Chandler company. Features will be etched name plates and thin washers and shims.

**L. C. Chase Co.**—Top fabrics in mackintosh cloths in popular materials and colorings in Chase leather will be shown as well as rubber-coated goods in both single and double mixture. The Chase company also manufactures at its own mills a line of cloths for top and slip coverings.

**Noonan Tool and Machine Works**—Shown for the first time is the Noonan adjustable motor car trunk jack, Fig. 21, designed to be secured to the rear of a car body. It is of lattice construction, made from spring steel parts, which are hot-forged into shape, machined and finished with two coats of enamel. It attaches to the body sills, and is reinforced by brace straps S, which permit of its folding up in the rear of the body when not in use. In addition to this rack, the company has its line of fine tools, such as chisels and punches, put up in sets of leather rolls and wooden boxes. The company has what it terms its four-in-one valve tool for repairing damaged tire valves, this tool being capable of removing the plunger, rethreading the outside, rethreading the inside and rethreading the end. The concern's line also includes brass foot and robe rails, and other body parts.

**Leon Mann Co.**—A complete line of motoring clothing is promised by the Mann company, whose line includes coats for motoring, driving, touring and traveling. Women's motoring apparel also is handled.

**Janney, Steinmetz & Co.**—The main display to be made by this company will be cold-drawn seamless steel products such as various styles of gasoline storage tanks, gasoline tanks for motor cars or motor boats in various sizes and cylinders for air pumps and tank fittings. The tanks used for carrying gasoline are completely coated with pure block tin in order to prevent deterioration due to the action of foreign substances in the gasoline.

**Jarman & Baker**—The novelty on the stand of Jarman & Baker will be a new trunk rack which is built especially for the model T Ford. It will also have a new Lacoste type of timer with an annular ball bearing roller and self-adjusting ball-bearing shaft. In addition, there will be a line of horns, trunk racks, tire pumps, portable vulcanizers, pressure gauges, tire lugs, limousine speaking tubes and tire tools.

**Harry A. Allers & Co.**—Handling Solarine metal polish in liquid, powder and paste forms, Allers & Co. have brought out a new liquid polish made of denatured alcohol which is manufactured by a secret process which is claimed to make it non-inflammable.

**John Lucas & Co.**—Manufacturers of car bodies will find much to interest them at the stand of Lucas & Co., who will display a line of coach and car colors suitable

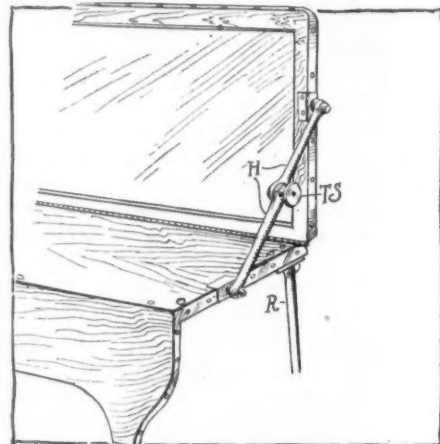


FIG. 24—ZIG ZAG WINDSHIELD

for the finishing of bodies. In addition, this concern also will show the Lucas Auto-Klean, which, as its name indicates, is used for cleaning the body of the car.

**Phineas Jones & Co.**—This company will exhibit its lines of motor car wheels, also spokes and felloes, to show the wheel construction as well as the size of different parts.

**M. H. Cormack & Co.**—The line of goods handled by this concern consists of Supplementary spiral springs, combination grease and oil guns, Victor anti-skids, Brake-Circuit auto-locks and spark plugs.



## Lamps and Lights

**Davis-Bournonville Co.**—Acetylene pressure generators, oxygen tanks, regulators, hose, etc., will be shown in the way of apparatus that will interest the motor car manufacturers. The company intends distributing samples of welding and cutting of different metals to show the adaptability of its oxy-acetylene cutting and welding process to the various commercial metals. This new process is said to be particularly valuable in repair work, for by this method it is possible to reclaim broken parts and build up and strengthen where necessary and do other motor surgery stunts.

**Avery Portable Lighting Co.**—This concern's gas tanks for lighting purposes are cylinders made from cold-drawn seamless steel, with the bottom end of double thickness and brazed so that its pressure-resisting qualities are increased. The tanks are filled with purified, dry acetylene gas formed from carbide. Each tank is filled to a pressure of 225 pounds in a temperature of 60 degrees Fahrenheit, so that when the temperature rises to 80 or 90 degrees the pressure increases to 375 pounds. Each tank is fitted with a needle valve threaded to connect with the line of piping to the lamps. A regular valve is provided for them, with a series of perforations whereby the proper amount of turn or opening given to the valve can be made in the dark as well as in the daylight.

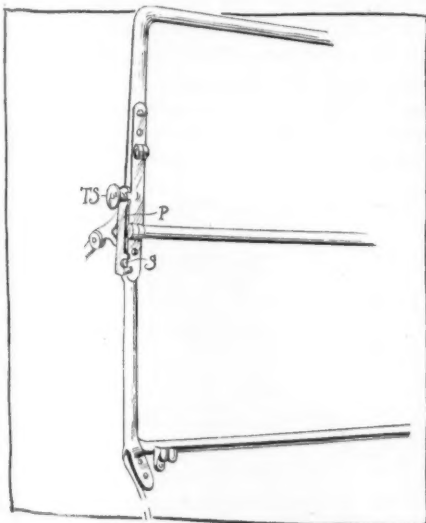


FIG. 25—DIXIE WINDSHIELD

The company also manufactures special boxes of pressed steel for carrying the tanks on the running boards.

**Manhattan Screw and Stamping Works**—Attention is drawn to the double focus reflector used in the new searchlights manufactured by this concern. The reflector is made of glass and metal and designed to project the central rays A horizontally; whereas the side rays B rapidly

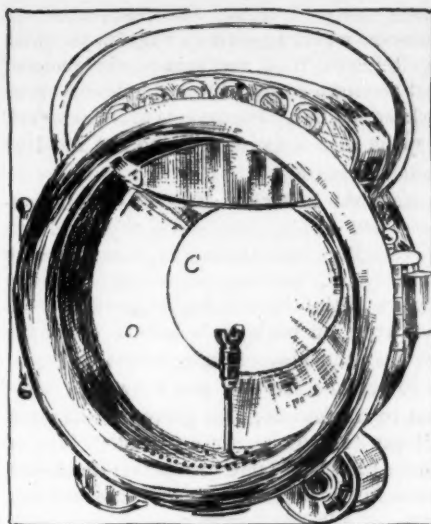


FIG. 26—ROYAL JUPITER HEADLIGHT

diverge. This is accomplished by using a plano-convex lens L in the center of the mirror, which is of a shorter focus than normally used. The outer reflector H is of aluminum. The aluminum part reflects the diverging rays which are used for lighting the roadway immediately in front of the car; whereas the long central rays are projected far in advance of the vehicle.

**Post & Lester Co.**—Particularly novel in the line of lamps marketed by this concern is the Royal Jupiter headlight, Fig. 26, made with a double lens. The inner or center lens C throws a single flood of light with practically parallel rays, whereas the outer one O diffuses the light. The object of this combination lens is that the rays projected by the lens C light up the road far in advance of the car without unnecessary loss due to too quick divergence, whereas the lens O rapidly diverges the rays, lighting the full width of the road immediately in front of the car.

**R. E. Dietz Co.**—The line on exhibition shows nothing radically new over that of the past season, it including mirror lens headlights, Flarefront headlights, searchlights and square dash lamps. In addition to these are various types of oil, dash and tail lamps and generators.

**Garvin Machine Co.**—Machinery adapted to the manufacture of motor cars and parts will be exhibited by the Garvin company, which will show constant speed drive universal machines, motor-driven, for tool room purposes; a vertical spindle milling machine designed especially for milling gear and crankcases; a Monitor lathe, with a quick stop and open chuck.

**A. W. Harris Oil Co.**—This concern will exhibit the Harris gasoline cylinder oils in light, medium and heavy grades, also superheat cylinder oil, adapted for steam cars. In addition is a line of lubricants, such as transcompound for gearsets in dark and light color, and motor grease and graphite grease. The Harris light grade oil is well adapted for winter use.

## Miscellaneous Accessories

**Noera Mfg. Co.**—A line of oilers of all kinds will be shown by this concern in addition to pumps designed for motor car use. The oil gun has two sets of plunger washers, one set sucking up when the handle is drawn out, and the other forcing the oil out when pushed in the barrel. It has a crook neck handle, and works equally well in thin or heavy oil.

**Orlando W. Young**—Motor car specialties make up the line of Orlando W. Young, who features oils and lubricants, and in addition handles Cox's patches for repairing inner tubes, plugging cement, rim shellac, grip cement, etc.

**G-L Economizer Co.**—The G-L Economizer, made under the Gillett-Lehmann patent is an air-controller and is designed to give the motor the right mixture at all speeds. The operation of it consists in converting the atmospheric pressure in the float chamber into a partial vacuum which is controlled by the speed of the engine and is therefore automatic. This Economizer can be attached to all carbureters that have a float and throttle.

**Caloris Mfg. Co.**—The Caloris bottle, which is of the vacuum type, is composed of two bottle, one within the other and with an air space between from which the air is exhausted by means of suction pumps until a vacuum results, this vacuum preventing the contents of the bottle from being affected by outside conditions

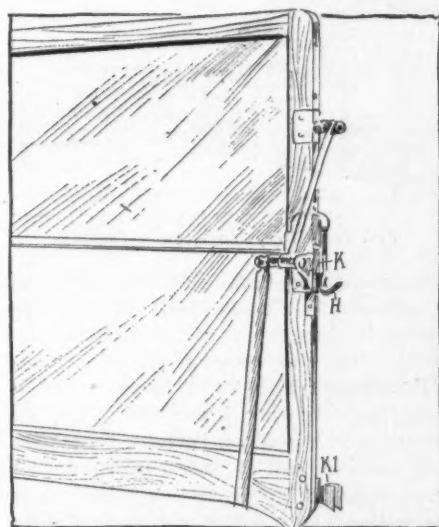


FIG. 27—WILLIAMS WINDSHIELD

of heat or cold. The glass part is so arranged that it can be easily removed or replaced, which does away with the necessity of returning the case to the factory for a new glass part should it by chance become broken.

**Anderson Forge and Machine Co.**—The Anderson company intends displaying motor car tools, drop forgings, steam hammer forgings, finished crankshafts, and

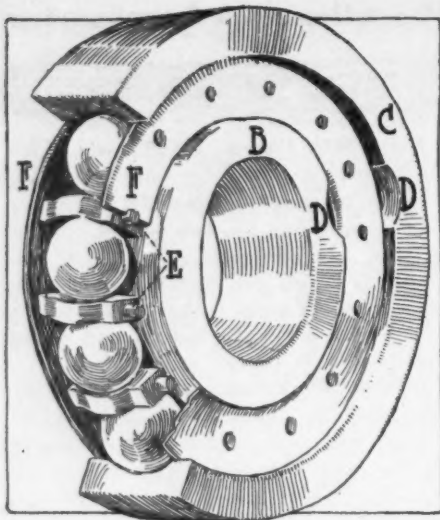


FIG. 28—SCHAFER BEARING

the Detroit emergency spare wheel. Demonstrations of the spare wheel will be given during the show.

**Schafer Bearing**—The Schafer bearing, a German importation, agrees with the conventional annular ball bearing in the use of concentric races B and C, with opposing grooves for containing the balls. This bearing, however, differs from others in that 92 per cent of the annular space is filled with balls, which is accomplished by the use of particularly thin spacers E, which, at each end, anchor in a retaining ring F, thus completing the bearing structure. It would be impossible to get the number of balls used in the

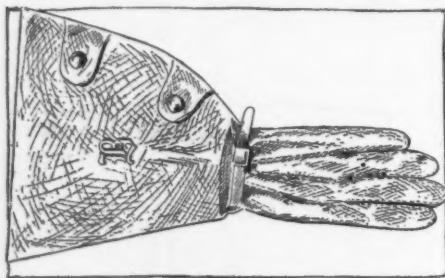


FIG. 29—CUFF GLOVE WITH INITIAL

Schafer bearing between the races B and C without the employment of entering spaces D, through which the balls are entered after the bearing space is practical.

**Hess-Bright Mfg. Co.**—The cage type of Hess-Bright bearing, illustrated in Fig. 32, has the balls contained between concentric ring races A and B and employs a one-piece separator S, which is a bronze casting with pockets milled out to a slightly larger diameter than the balls. This separator is inserted after the balls are in place and the projecting prongs P and P1 are bent over in a die so that each ball is practically enclosed. As the illustration shows, the separator is one-piece without rivets of any nature.

**Schwarz Wheel Co.**—Practically no changes have been made in the physical make-up of the Schwarz artillery wheel, the only change in the policy of the company being the manufacture of wheels for

heavy motor trucks. The feature of the Schwarz wheel appears in Fig. 33, in which the tennons T of the spokes are grooved and mortised so that they completely interlock at the hub. The wheels are assembled, a spoke at a time, each being put in place under pressure.

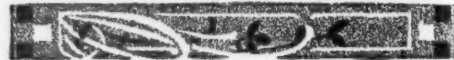
**Morrison & Ricker Mfg. Co.**—This concern will exhibit its wrist-fit ventilated gloves, Fig. 29. One style has a smooth leather cuff, whereas on another style is a gold initial in old English design. On the wrist of each is a buckle strap for drawing the glove snugly to the wrist, so as to exclude the cold and snow. In addition to its four-fingered glove, one-fingered mittens for winter use are made. Winter gloves are wool, lamb or squirrel-lined, and those for spring and summer use are unlined, or silk-lined with a ventilated back consisting of rows of tiny perforations, too minute to admit dust but allowing for ventilation.

**Pratt & Whitney Co.**—At this company's booth will be seen its latest designs of machine tools used in motor car and motor car accessory manufacture. The list of tools manufactured by the concern includes a 16-inch geared head engine lathe, a vertical surface grinding machine, spline milling machine and thread milling machine. These machines will be seen in operation.

**R. H. Smith Mfg. Co.**—The 1909 models of Smith motometers are practically the same as the 1908 ones, the only change being one relative to the connection of the odometer. The company manufactures 50, 60 and 100-mile instruments, in all of which the maximum hand is extra. This instrument is one of the simplest of those operating on the centrifugal force scheme as illustrated in Fig. 30 consists of balance weights B linked to the rotating shaft S at the upper end and to a bushing C at the lower end, which is on a sleeve. In proportion as the weights fly outward, with increased speed of the shaft S, the bushing C is raised and with it the pointer works on the vertical dial.

**Globe Machine and Stamping Co.**—Pressed steel tool boxes, battery boxes, foot rests, robe rails and brass handles make up the line of the Globe company, which, however, places the emphasis on the steel boxes, which are offered in a variety of styles and sizes. One of these is combination running board box, which is 27 inches by 11 by 10 1/4 inches high and containing three compartments, one 11 by 6, another 21 by 4 1/2 and the third 21 by 6 1/2 inches, and which is furnished with two locks, a tray and partitions, with a raised panel in the cover. It is designed to take 20-inch gas tanks, air tank, tool roll, jack, pump, etc., thus ridding the valuable locker room in the tonneau of much of the "truck" which, however, is absolutely necessary for the proper equipment of a car. There also is furnished with this a special tool tray, which is felt-covered and which holds a supply of tools.

## Oils and Greases



**Adam Cook's Sons**—Seven different consistencies of Albany grease and some Albany grease cups designed for motor car use will be shown by the Cooks. Albany grease has been in use 40 years and it is claimed it does not drip, splash or waste away and which first was used in gear boxes by motor car manufacturers. A demonstration of its economy and adaptability will be made.

**White & Bagley Co.**—The line of Oilzum oils include light, medium and heavy grades, which are of high fire test and finely filtered to remove carbon. Oilzum high pressure superheated steam cylinder oil also will be shown. As a demonstrating device the company will exhibit oils in motion, which will show the different colors and setting forth the degree to which they are filtered. This device will make it easy to note the different thicknesses or bodies of the oils. The company also has a brass running board device for carrying a supply of oil.

**William C. Robinson & Son Co.**—Autoline in seven grades will be shown, it being, as its name indicates, an oil for the lubrication of motor cars. No. 1 is for the lubrication of steam machines; Nos. 2, 3, 4, 23 and 00 for gasoline motors of various makes, and No. 5 for use on external bearings and electric machines. Then there is Greoil, a non-fluid oil for use in transmission and gear cases and which comes in two grades, one thin and the other soft. For those who do not care for a non-fluid oil the company has a heavy-bodied transmission oil. The B journal compound is for use in compression and other cups, on open bearings and in case gears.

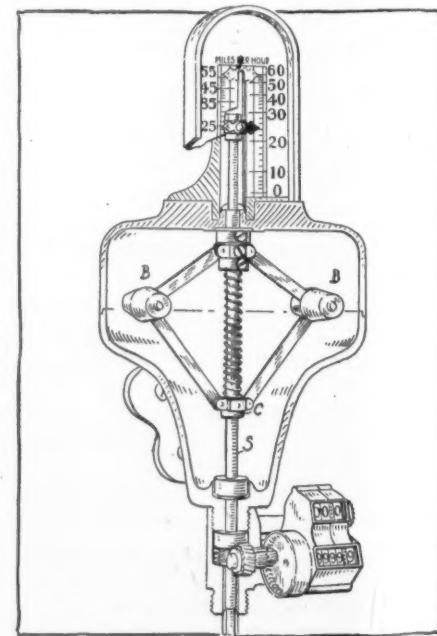


FIG. 30—SMITH MOTOMETERS



## Ignition Devices



**Mica Core Mfg. Co.**—The Eccentric spark plug manufactured by this concern presents a novelty in the ignition line in that the distance between the central electrode A and the end of the plug B can be varied from the minimum to the maximum length of spark by giving the core C a half turn in the shell. The illustration shows how the shell part S is bored eccentrically to take the core C, and that the electrode B is a ring formed by the lower end of the casing, so that in a half rotation of the core C spark gap varies from minimum to maximum. This change in the length of the gap can be accomplished by slackening the bushing nut N and giving the core C the necessary rotation, after which the nut N blocks it in the desired place.

**E. M. Benford Co.**—The Monarch line of mica and porcelain spark plugs, which has been on the market for 8 years, will be exhibited by the Benford company, which also will have a timer of the roller bearing contact type, for which much is claimed.

**Champion Ignition Co.**—Albert Champion has been busy of late and the results of his labors will be shown in a line of A C spark plugs designed by him. In addition the company will show different types of magnetos, some new wiring tubes and wiring blocks and insulated cables.

**Apple Electric Co.**—Storage batteries for ignition and lighting purposes make up the line of the Apple company and particular attention is called to the fact that the Apple storage battery is made entirely from hard lead alloy, hard rubber and rubber sealing compound, all claimed to be acid-proof materials. There are no metal binding posts—except hard lead, which

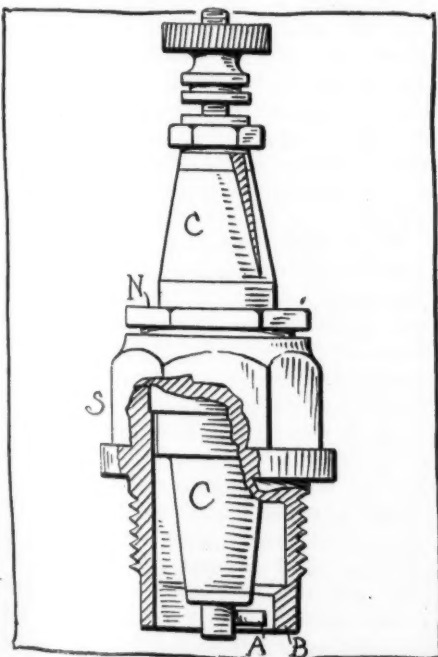


FIG. 31—ECCENTRIC SPARK PLUG

does not corrode—screws, name plates, handles or other metal trimmings and wood containing cases. The grid of the plates is made from an alloy of lead and antimony, and the plates and the complete element are joined by hard and strong lead straps securely burned together, overcoming open circuits. Internal short circuiting is avoided, it is asserted, by the plates being spaced by special treated separators. The complete elements are assembled in hard rubber compartment jars. A point made by the company is that there is liberal space allowed for making a firm seal with the rubber asphaltum acid-proof compound used, and that the binding posts are so braced that if in tightening the hard rubber thumb nuts pliers are used there is no danger of breaking the seal into the battery compartment. The corners of the hard rubber case are rounded together with the outside edge at the top.

**Electric Storage Battery Co.**—There are two new designs of the Exide sparking battery ready for display in the garden, one of them, the Exide-Duplex, being designed as a reserve. This is accomplished by placing three cells of the standard Exide with three cells of a smaller capacity in one containing case. If for any reason the main battery goes down and out it is possible to switch into circuit the reserve. These Duplexes come in two sizes. The Exide emergency sparking battery also is in the nature of a reserve, the small cells being placed in a case and so located that it may be switched into circuit very easily.

**R. E. Hardy Co.**—Besides the McIntosh carbureter the Hardy company intends exhibiting its line of Sta-Rite plugs in four styles. The No. 49 is a mica plug made of solid bolts from Bessemer steel rod and a solid mica core, with a long extension from the end of the shell to the points and with a large air space around the core. The feature of No. 55, known as the Gotham type, is that a partly closed end protects the porcelain tube and that an enlarged chamber in the shell provides for extra air space. Also there is a bronze bushing designed to prevent sticking in case it is desired to take the plug apart for cleaning purposes. Leakage is guarded against by means of a milled steel shell and bolt with copped vulcabeston packing gaskets. The Venus, No. 32a, is another mica plug with the inner core made with no shellac or other sticking substance. The Vulcan, or No. 4a, is a porcelain plug, with a cap to protect the inner heated tube.

**Kitsee Storage Battery Co.**—Recharging dry storage cells is a new idea which has been worked out by the Kitsee Storage Battery Co. and which will be demonstrated in the garden. As explained by the company, the battery is sold in units, each cell giving 2 volts. By combining two or more cells the consumer obtains any desired voltage and when the batteries are discharged the consumer can take

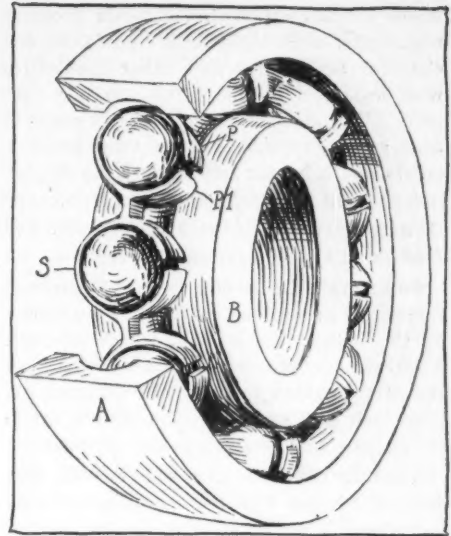


FIG. 32—HESS-BRIGHT BEARING

them to any agency handling K. C. batteries and for a nominal sum exchange them for fully charged batteries. The agent in turn packs the batteries in a compartment crate holding fifteen cells and returns them to the factory, which sends back recharged cells. It is pointed out that by this system it is possible to handle storage batteries in any city or town regardless of whether or not there are facilities for recharging batteries in that particular town.

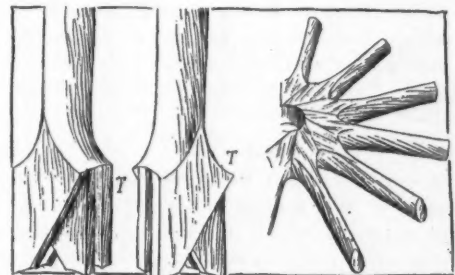


FIG. 33—SCHWARZ WHEEL

**K-W Ignition Co.**—Several varieties of K-W magnetos are promised for the A. L. A. M. show, among which is one with a gear drive, model C and C-M, which is designed for jump spark or make-and-break. A new idea in the magneto line is ready but the company is saving it for the show, when the details of construction will be given out.

**Vesta Accumulator Co.**—No change has been made in the Vesta battery, the company intending to make its play on its new line of electric lamps for motor car use. The Vesta side dash lamps are equipped with a silver-plated parabolic reflector and a patented device for focusing the bulb, which is a 6-volt Tungsten. It is claimed that a pair of side dash lamps will burn in the neighborhood of 30 hours on a single charge of a Vesta 6-volt 80-ampere lighting battery, which also may be used as a reserve sparking battery.

**Lunkenheimer Co.**—Generator valves, gasoline strainers, combined priming and relief cocks, drain and gasoline cocks,

hand, air and oil pumps, exhaust pressure regulators, unit sight-feed manifolds, mechanical lubricators and other specialties will be shown by the Lunkenheimer company. The mechanical lubricators come in four styles, type A having two compartments and a hand pump; type F having an independent manifold and six feeds; type H with an independent manifold and five feeds, and type L, another six-feed.

**Columbia Lubricants Co.**—Monogram lubricants of various grades will be shown by the Columbia company, which also will illustrate the process of refining oils from the crude, which process will demonstrate how each and every portion of the crude oil is utilized for some useful purpose.

**Vacuum Oil Co.**—The line of oils carried by the Vacuum company will be displayed in an attractive manner in the company's booth.

**American Electric Fuse Co.**—It is intended by the American Electric Fuse Co. to display the American igniter, which is fully described and illustrated in the present issue of *Motor Age*, pages 74, 75. The igniter is a self-embodied coil, timer and distributor and is mounted directly on the motor. The demonstration of this device will be made by means of two four-cylinder igniters and one six-cylinder on revolving spindles, supported by a cable and showing the spark passing over the spark gaps in the plugs. In addition the company expects to have a new current switch by which the ignition system is locked by means of a combination, but it is not certain if it will be ready for the garden show.

**Never-Miss Spark Plug Co.**—The No. 8 is the latest idea in spark plugs brought out by this company, the peculiar construction of which assists in preventing short-circuiting and sooting. The company has in mind a special demonstrating machine to prove its claims for this plug. In addition it will exhibit and demonstrate its ammeters, chain-repair devices, battery connections and terminals.

**High Frequency Ignition Coil Co.**—The Seeley ignition system will be shown, representing the initial adaptation of high frequency oscillatory discharge to ignition, it being claimed that by the substitution of the oscillatory discharge for mechanical vibration all working mechanism, including vibrators, is done away with, yet each discharge consists of a plurality of sparks, all occurring in a shorter period of time than is occupied by one stroke of a vibrator. The coils are  $2\frac{1}{2}$  inches in diameter and  $1\frac{1}{4}$  inches in thickness and are

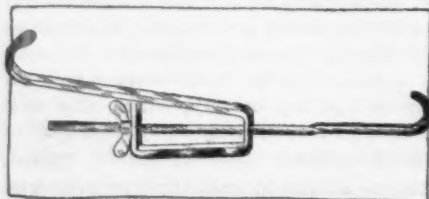


FIG. 34—NEVER MISS CHAIN REPAIR

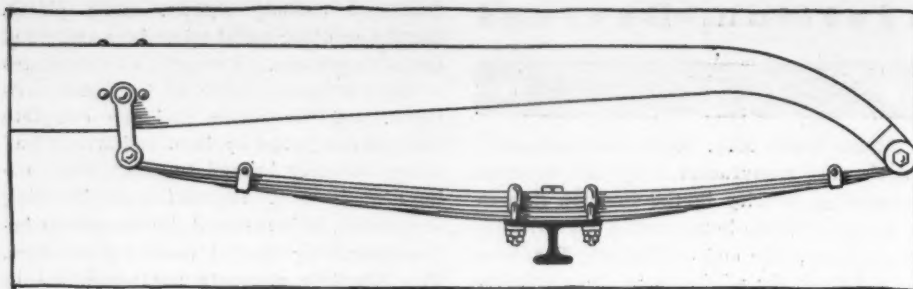


FIG. 36—PERFECTION SPRING

designed to attach to each cylinder close to the plug, which, it is said, delivers the energy direct to the combustion chamber without loss or leakage. Among the claims made is that it does away with all working parts, adjustments, platinum points, etc.; that all the energy is delivered at one terminal; that it cannot puncture from overload; that it will run direct from a magneto or battery of any voltage without burning out; that it will deliver

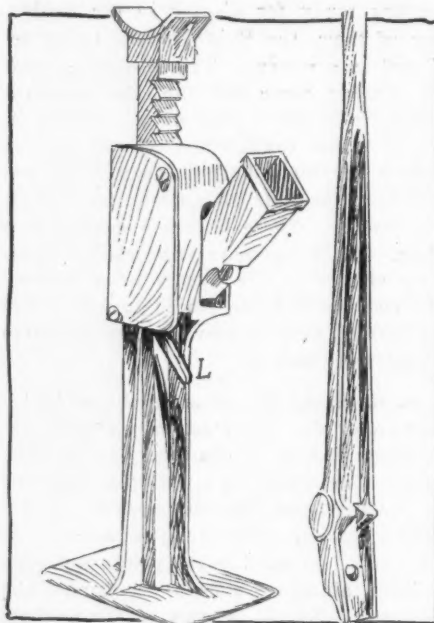


FIG. 37—BARRETT JR. JACK

a better and a longer spark; that it is non-sooting; that there is no electrolytic action on the spark plugs or contact points; that it occupies one-fourth the space of other coils and does away with the use of cables, and that it is economical to maintain.

**A. Origet & Co.**—Novel features are claimed for the new Silicia storage battery which is offered for inspection by this concern. In addition to extreme light weight and small size compared with others of the same capacity, the Silicia

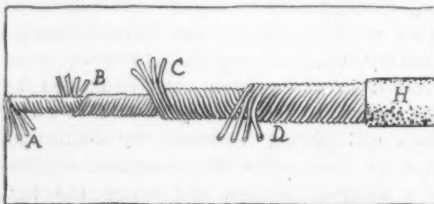


FIG. 38—WEBB FLEXIBLE SHAFT

can be recharged like any other storage battery, or, if the motorist so desires, he can recharge it himself on the road by replacing the center column or cylinder with a new one. Plates or grids have been replaced by a single cylinder made of special alloy, the cylinder containing the acid material in the form of a paste, the composition of which is the inventor's secret. The battery was shown at the recent Paris salon for the first time. It is made for sparking and lighting purposes only, and from all sizes from  $2\frac{1}{2}$  volts 20 amperes for motor cycles up to 10 volts 100 amperes and over for six-cylinder cars. The weight of the 5-volt 30-ampere battery is only  $3\frac{1}{2}$  pounds and the size, 5 by  $5\frac{1}{4}$  by  $2\frac{3}{8}$  over all.

**Union Battery Co.**—Nue dry cell batteries will be shown by the Union company, the claim for them being higher amperage and longer life than others of its type. The feature is a new depolarizer which gives the 6 by  $2\frac{1}{2}$  inch size cell a voltage of 1.6 and an amperage of 34.

**H. H. Franklin Mfg. Co.**—Believing the general public will be interested in the operation of its die-casting department, the Franklin company has taken an extra space among the exhibitors of accessories for the purpose of showing die-cast parts designed especially with a view to interesting motor car manufacturers. Among the castings will be timers, magneto parts, oil and water pump parts and bushings. There will be a miscellaneous assortment of die-cast parts which, while they may not be intended for use in motor car work, will give suggestions as to the class of work covered by the process and may enable engineers to design with a view to using die-cast parts more extensively.

**Webb Mfg. Co.**—This company's line consists entirely of flexible shafts, polishing, grinding and drilling apparatus and wire belts. The flexible shafts are of the wire cable type, Fig. 38, in which the strands of wire are wound upon one another to avoid internal friction when the shaft is rotated in a bent position. The illustration shows a series of windings A, B, C, D, all encased in the cover H.

**Cook's Standard Tool Co.**—The Standard jack of this concern has been improved by the addition of a reversing lever L, Fig. 41, which takes the place of the button heretofore used in this jack. To lower the load the lever L is pushed down by a cap with the handle or finger. Whether rais-



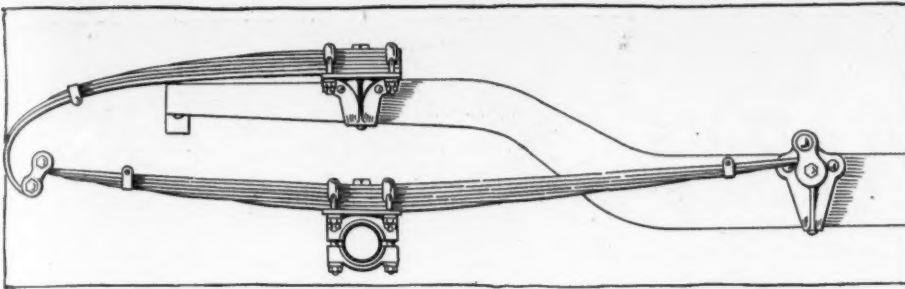


FIG. 40—THREE-QUARTER ELLIPTIC PERFECTION SPRING

ing or lowering the jack, the lifting is done on the downward stroke only, the upward stroke being free. The frame and socket levers are of malleable iron, the rack bar R is of carbon steel and the jack is made in three sizes to elevate  $6\frac{1}{2}$  and  $5\frac{1}{2}$  inches.

**Perfection Spring Co.**—The Perfection Spring Co., in addition to its line of dual-acting springs which it has had on the market for several years, has a three-quarter type, specially designed to be used in conjunction with dropped frame construction, as illustrated in Fig. 36. The semi-elliptic portion is of standard construction and the upper quarter has a scroll end at the rear. In Fig. 40 is illustrated a conventional semi-elliptic front spring designed by this concern and which is offset on its seating, the front half being shorter than the rear in order to throw the axle forward of the radiator if so desired. This company is manufacturing these springs out of Vanadium, Krupp, crucible and special open hearth steel. All of the springs are hand-fitted and oil-tempered. In addition to the types illustrated the company continues its line of two-part, or dual, semi-elliptics, such as used for several seasons.

**Triple Action Spring Co.**—The Triple Action Spring Co. introduces for this season its new spring designs, Fig. 42, in which the weight of the car transmitted through the studs S compresses the coil C, causing the link L to describe a circle downward from the bolt B, as indicated by the arrow A. This action would lessen the horizontal distance between the points B and S, but the two will work in harmony, as the weight that compresses the coil C will also act upon the side springs P, producing an elongation of it to compensate for the draw of the link L in its downward circle, so that, assuming the coil C and the side spring P are of the proper relative tension, it is necessary to apply the normal load before the bolt B can be placed in position, which gives the link L an almost horizontal position, thereby preventing any shortening of the side spring P. In case of recoil the sudden release of the load from the side spring P causes it to assume the position it occupies without load, which is usually 3 or more inches higher than when loaded, and consequently 2 inches shorter. But as the link L prevents this shortening, the side spring P only can go to its normal loaded position

before the draw of the link L will raise the axle and wheel from the ground. A feature of this spring is the ability to lower the suspension of the car without affecting the level of the car, this being accomplished by removing the vertical link to which the regular semi-elliptic springs attach when the triple action is put in place.

**Duff Mfg. Co.**—The new member of the Barrett jack family in the 1909 list is the Barrett Junior, with a raise of 6 inches, P,

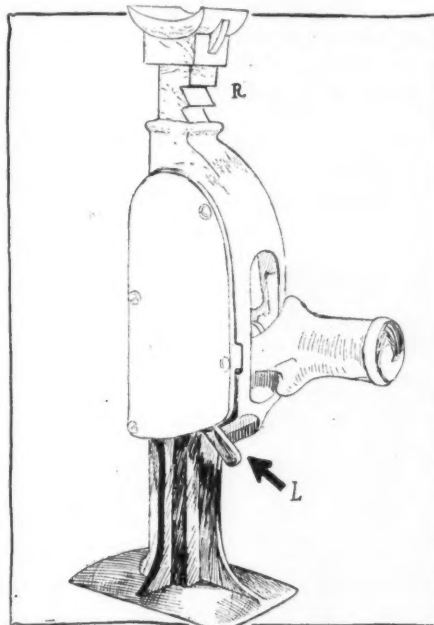


FIG. 41—COOK'S STANDARD JACK

like the Barrett Standard jack and intended for medium and light-weight cars. It contains the improved reversing lever L, Fig. 37, for controlling the up or down movement of the lifting bar. It is furnished with a metal operating lever, which may be used as a tool or hammer and has a lifting capacity of 1,500 pounds. All of the other Barrett jacks have a 2,000-pound lifting capacity and operate along the same lines, differing only in the amount

of raise, which is 5 inches in some and 6 inches in others. The company has a line of jacks intended for commercial car use, one with 5,000 pounds capacity and the other with 10,000 pounds.

**American and British Mfg. Co.**—Four motors will constitute the exhibit of this concern, these being of the four and six-cylinder type of the following sizes: a 22-horsepower with  $3\frac{3}{4}$  by 4-inch cylinders; a 26-horsepower with cylinders 4 inches square; 40-horsepower with 5 by  $4\frac{3}{4}$ -inch sizes, and the 60-horsepower six-cylinder type with a bore of 5 inches and a stroke of  $4\frac{3}{4}$  inches. All of these motors are characterized by the one-piece crankcase, carrying in the bottom of it an oil reservoir from which a gear pump elevates the oil to the parts in need of lubrication. All types use twin-cylinder castings with valves on one side and are furnished for magneto ignition. Features in the general construction of these motors are heat-treated crankshafts, die-cast hand-scraped babbitt bearings, nickel steel valves and hardened cams keyed and pinned in position.

**Brennan Motor Mfg. Co.**—This company's line of motors consists of three types—two-cylinder horizontal opposed, four-cylinder vertical and six-cylinder vertical. In addition to these the company manufactures selective, sliding and planetary gearsets. The four and six-cylinder motors are made with separately cast cylinders, taking valves on the right side, the intakes in the tops of the valve chambers and operated by overhead rocker arms and the exhausts actuated by direct lifter rods in communication with the camshaft. Double ignition with high-tension magneto and battery current supplies is fitted on four and six-cylinder models. Lubrication is by the crankcase reservoir system, in which a pump elevates oil from a reservoir in the base of the crankcase through oil leads to the various motor bearings, from which the surplus falls into the crankcase proper, where a constant level is maintained. All excess oil beyond this level is returned to the reservoir, where it is filtered and ready for recirculation. The two-cylinder motors are in three sizes—12 to 14 horsepower with  $4\frac{1}{2}$  by 5-inch cylinders; 16 to 18 horsepower with cylinders 5 inches square, and 20 to 24 horsepower with  $5\frac{1}{2}$ -inch bore and 5-inch stroke. The two four-cylinder types use the same size cylinders as in the first two horizontal types, and the six-cylinder employs the same sizes as in the 12 to 14-horsepower one.

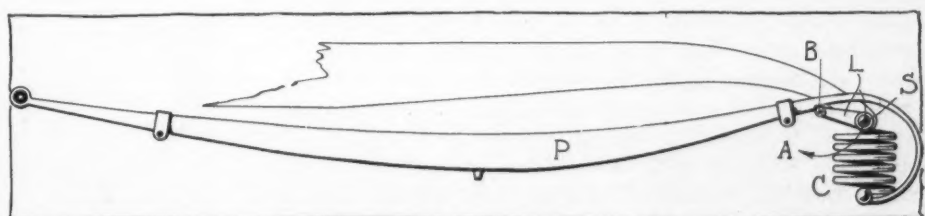


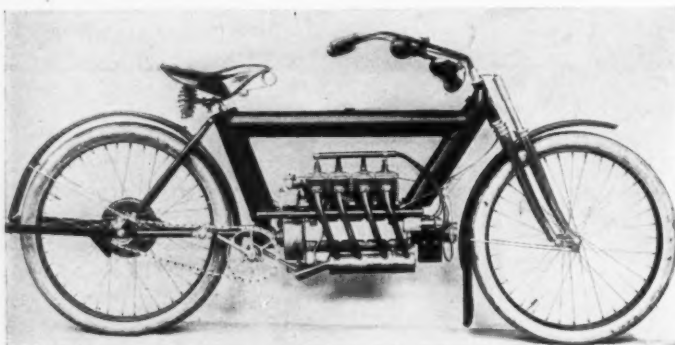
FIG. 42—TRIPLE ACTION SPRING DESIGN



**A**T the start of no other year has the outlook for motor cycles seemed so bright as the one that faces the manufacturers and dealers in the two-wheelers. It is apparent that the missionary work has gone on long enough to establish the motor cycle on a firm basis; that the buying public had been convinced that it is a speedy, safe and economical method of transportation and that the dealers have awakened to the business advantages offered through handling one or more of the many lines that are now out. Plants are being established all over the country for the manufacture of motor cycles, capital is being interested and it would seem as if 1909 ought to be the banner year, with even brighter prospects ahead for 1910. The recognition given this industry by the Association of Licensed Automobile Manufacturers in setting aside a separate section for the two-wheelers is in itself a victory that ought to make the manufacturers of motor cycles realize that they have at last arrived.

#### Motor Cycles in Madison Square Garden

The motor cycle section of the Madison Square garden show will be a miniature exhibition in itself. It will comprise one-



NEW FOUR-CYLINDER 7-HORSEPOWER PIERCE

twelfth the total number of exhibitors in the show and is almost as numerically strong as the motor car division. It will be a comprehensive display, too, for the machines will not be tucked away in odd corners as has been the case in the past; but massed together where they can make an impression upon the public. Not only will there be makers of motor cycles represented but there also will be several big houses handling motor cycle accessories, which in itself is no small business.

Imported machines will not be very numerous, although there will be two or three representative machines on the floor. The foreigners have not succeeded in getting a very strong footing in this country and their main strength is found in the east, in and around New York city. In the western section of this country there are few of the machines from across the water and their number is growing less each year.

#### Motor Cycle Tendencies For This Year

Designers have been busy for the last year, and as a result of their labors there will be several departures from the conventional, chief of which will be the debut of an American four-cylinder machine, the first of the kind to be put on the market. It will be of Pierce design and it will mark the bow of the Pierce Cycle Co. into the motor cycle field. For 2 years the company

**By C. G. Sinsabaugh**

has been experimenting, but it refrained from invading the market until it was satisfied with its product. The four-cylinder

motor is said to be a miniature reproduction of the engine used in the Pierce-Arrow motor car, even including the Pierce lubricating system. Another new idea will be a three-cylinder engine which will be fitted to one of the Curtiss models and which, it is thought, worked out from the engine Curtiss makes from the aeronautical end of the game.

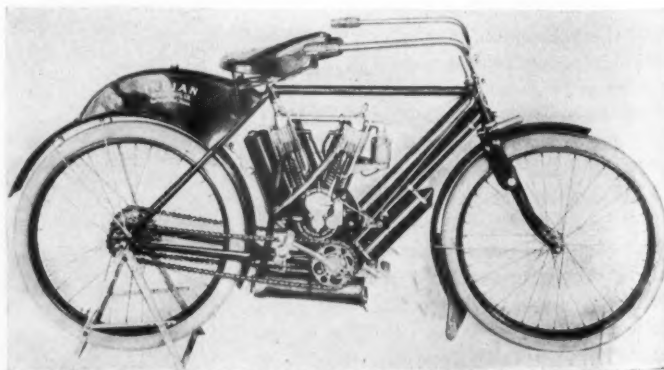
Twins there will be a-plenty, for nearly every one of the big concerns has added to its line by putting out a two-cylinder to meet the demand for a fast road machine. It will be the first serious invasion of the motor cycle field by the twin, which heretofore has been offered by only two or three of the manufacturers. However, the twin gained a good foothold last season and now the makers believe there will be a steady demand for it throughout the country.

Along with the twin comes a demand for a low position on the machine, one that will permit of the rider placing both feet on the ground when at a standstill and which will facilitate easy starting and which makes the machine easier controlled in traffic. It will be found that the frames for 1909 will range from 19 to 21 inches. To secure this many of the makers have taken up the loop frame idea, which aids in securing this low position. Various methods are taken, some building a low frame which is reinforced with double top bars, which permits of utilizing the space between the bars for fuel supply tanks. In the working out of this idea it is the tendency to slant the top tube as it nears the saddle, which gives a drop of several inches to the seat mast tube, while the saddle post extends in the rear of this tube. There is one exception to this in the Curtiss, which has a special model with a straight reinforced bar which starts about the middle of the head of the machine and runs to the mast.

#### Double Grip Control on Many Machines

Handle bars for the coming season are fairly long and in most cases double grip control is used, doing away with the necessity of bending over and taking a hand off the bar to manipulate the spark, as has been the custom in the past. This, it is asserted, makes easier handling of the machine while at speed and also helps clean the handle bars of the machine of attachments much as the motor car designer is cleaning off the dash.

This is going to be a big year for the magneto, from all indi-



ONE OF THE INDIAN TWINS, THE 5-HORSEPOWER MACHINE



# Department

ations, especially on the machines with twin cylinders. Some of the makers are offering it as a regular equipment, while others are providing for its use but charge extra for it. In the case of the single-cylinders, though, the practice seems to be to stick to dry cells, although there are instances where options are given on the magneto. Magneto ignition, say the wise ones, is coming fast and it is predicted that in another 2 years it will be used almost universally.

Another important change is the growing popularity of the band brake which has come in with the big and speedy machines, which call for big braking surfaces in order to properly control a heavy motor cycle dashing over the roads at a pace of 40 and 50 miles an hour.

## Loop Frame Comes In

The loop frame is no new idea, but 1909 will be the first time it has been pushed to the front, it becoming popular through the demand for a low position. It also enables the designer to place his engine at a low position and also gives better carrying capacity for fuel supplies. In the matter of drive the war still wages between the chain and the belt, with honors just about even. Some offer both and there have been few desertions on either side. In Europe the tendency is to use the belt, but over here one of the combinations is to use gear drive from the engine in conjunction with the chain, which in reality is a reduction gear.

So far as clutches and two-speed transmissions are concerned there has not been much done. One concern, the New Era, is putting out a machine that is cranked like an engine and on which the pedals have been done away with. It has a friction clutch and a two-speed gearset and seems nearer being a two-wheeled motor car than anything yet offered. It is said the designers have been somewhat chary about developing anything along these lines because of a possible complication of mechanism. It is declared, however, that both the clutch and the two speeds are coming, but their universal advent is not looked for for another year or so.

## Mechanical Valves Popular

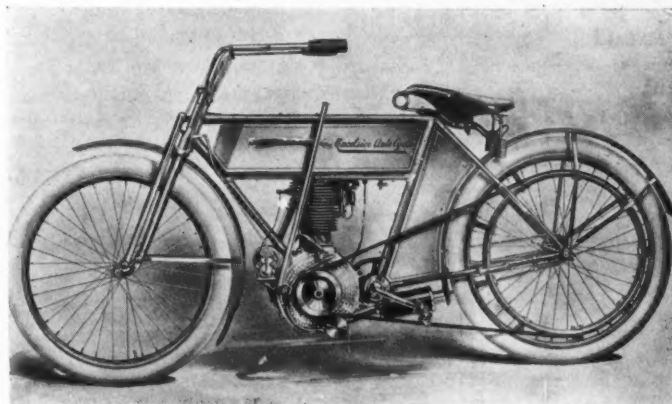
Little change is found in the valves, although there is a tendency to push the mechanical valve into popularity. The use of more ball bearings in the engine is noted and several are equipping Hess-Brights. The bore and stroke have been enlarged some and larger valves are noted on all sides. In the matter of lubrication both the splash and drop systems are in vogue.

Studying the horsepower ratings, it would seem as if the motor

cyclist had become speed crazy, for there has been a noticeable increase in power. Where a year ago the average ran about  $2\frac{3}{4}$  horsepower in the single-cylinder line, now it jumps to from  $3\frac{1}{2}$  to 4, while in the twins the increase has been from 5 to 7. The weights of the machines run about the same as before, but there has been a noticeable increase in the size of the tires, the jump being from  $2\frac{1}{4}$  to  $2\frac{1}{2}$  inches. The molded type of clincher is popular, both in single and double clinch.

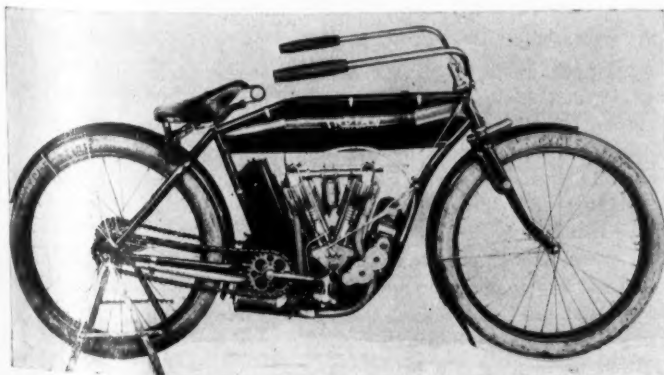
Not much seems to be doing in the commercial field, but it is not because the business is not there to be had. The field is a big one, because the economy of operation of the commercial motor cycle appeals to the buyers; but the manufacturers find themselves so busy making machines of the other type that they have not had time to go into the manufacture of the commercial proposition in the manner which it warrants.

**Pierce**—The Madison Square garden show will mark the introduction to the buying public of the Pierce motor cycle, on which the Pierce Cycle Co. has been working for the last 2 years and which it has kept under cover to the present time. The machine marks a radical departure in motor cycle construction. In

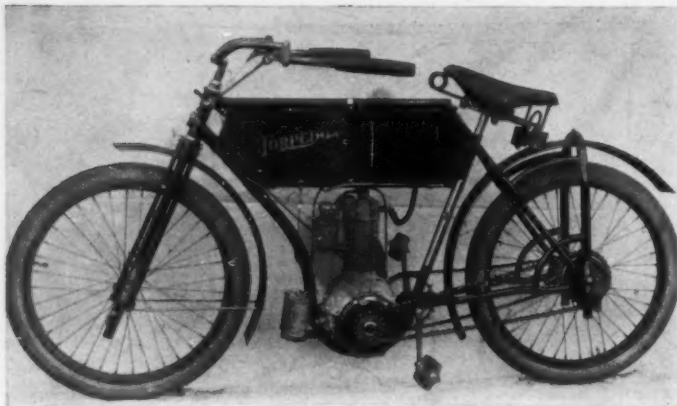


MODEL OF THE EXCELSIOR FOR 1909

the first place it has a four-cylinder engine which greatly resembles that used in Pierce-Arrow motor cars; there is a compensating clutch which equalizes the difference between the power of the motor and the resistance of the rear wheel; if necessary the clutch can be disengaged easily; there is a shaft and gear drive, mechanically-operated valves, a gear-driven oil pump and many other niceties that will be appreciated by the motor cycle expert. Next to the 7-horsepower, four-cylinder motor, the most startling surprise in the Pierce is the size of the tubing used in the frame. Whereas in the majority of motor cycles the tubing runs from 1 inch to  $1\frac{1}{8}$  and  $1\frac{1}{2}$ , that used by the Buffalo concern is  $3\frac{1}{2}$  inches and of 18 gauge on the top, bottom and upright tubes, while the motor supports and right lower rear fork are 1 inch in diameter and 16 gauge. The left lower rear fork is  $1\frac{1}{8}$  inches in diameter by 13 gauge and the upper rear forks  $\frac{3}{8}$  inch in diameter by 16 gauge. Taking advantage of this large tubing, the Pierce people have utilized it for carrying gasoline and oil, the top and upright tubes containing 7 quarts of gasoline and the lower or front tube 5 pints of oil. The tubes utilized for gasoline and oil are copper-plated inside. In the motor the cylinders, all gray castings and



LOOP FRAME 5-HORSEPOWER INDIAN TWO-CYLINDER

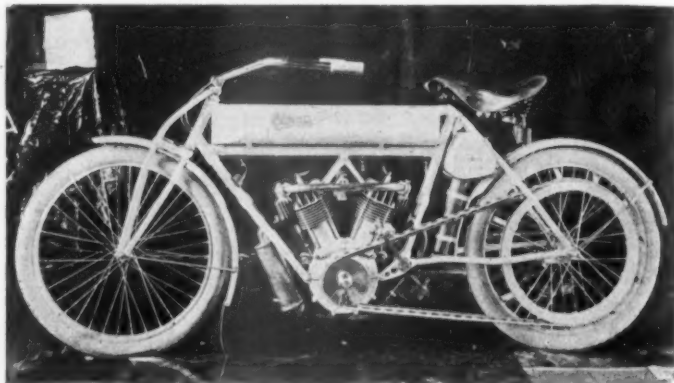


TORPEDO IN ITS 1909 DRESS

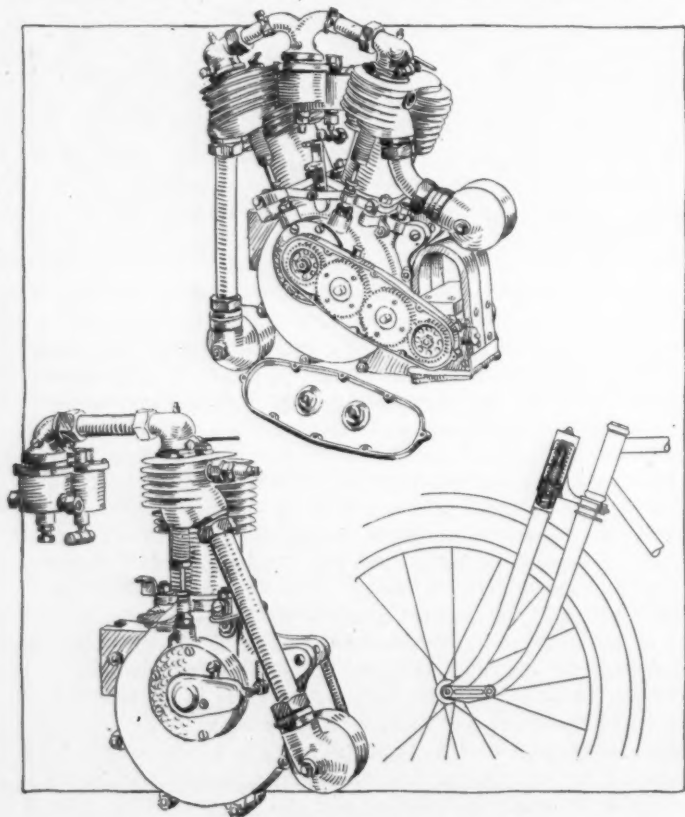
with wide cooling flanges, are separately cast, while the pistons are of gray iron and have three rings each. The bore is  $2\frac{1}{8}$  and the stroke  $2\frac{1}{2}$  inches. The crankshaft is a one-piece nickel steel creation and the bearings are large,  $\frac{7}{8}$  inch in diameter, with the main bearings  $1\frac{3}{8}$  inches long and the connecting rods  $1\frac{1}{8}$ , all running in phosphor bronze. The camshafts and cams are one-piece. The lubrication of the motor is by gear pump, which is located in the front part of the crankcase and forces the oil directly onto the bearings while the motor is running. The Bosch magneto is attached to the front of the motor. The driving mechanism is by shaft and gears, there being a disk clutch in the flywheel, which connects with a pinion on a jackshaft, which in turn drives a gear on front of the shaft running inside the left lower rear fork tube, there being a bevel pinion on the rear end of the shaft which engages a bevel gear on the hub. It is possible to release the clutch by loosening two nuts, which permits of the rider pedaling without running the motor. The wheelbase is 60 inches and  $2\frac{1}{2}$ -inch tires are fitted to the 28-inch wheels.

**Excelsior**—Well satisfied with the 1908 product, the Excelsior Supply Co. has had its engineering staff working on refinements rather than any radical departures, and the four machines that will be in the garden will be about the same as last year's, with

the exception that there are some new features in the way of accessories to the power plant. The four models really represent two types, one with 28-inch wheels and the other with 26-inch. The standard model is the 28-inch and one of these is equipped with a battery ignition system and the other with a Herz high-tension magneto. The difference between the 28 and 26-inch machines is only in the wheels, with the frame and forks of course modified to meet the new conditions. One of the 26-inch machines has a battery and the other a magneto. Studying over the changes, one notes that in the frame design the seat post cluster and the form of the seat post have been altered. With the latter the aim has been to improve the low frame position and the seat post, instead of being inserted in the vertical tube, is placed in the top frame tube and extends backward therefrom. The mud guard braces now are flat steel and secured to the frame independent of the axles. Another neat idea is to be seen in the magneto models, that device being carried on a forwardly extending platform, which is integral with the crankcase. The battery box, now being out of commission because of the installation of the magneto, is used as a locker, being provided with a hinged door and arranged to carry extra tire equipment, or clothing. Not much change has been made in the handlebar design, the center member of which is a drop forging, while there are no holes of any sort that might impair the strength of the bar. The



TWIN-CYLINDER BROUGHT OUT BY CURTISS



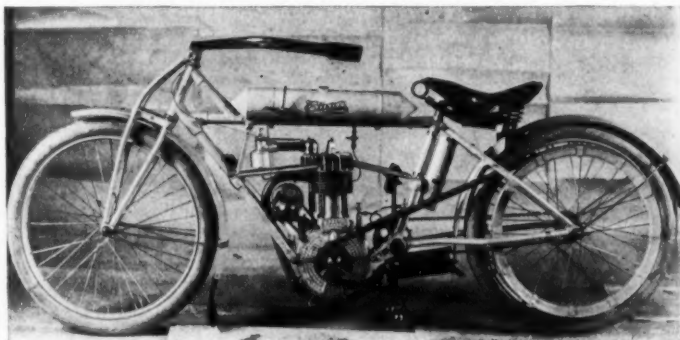
PEUGEOT 7-HORSEPOWER TWO-CYLINDER ENGINE  
PEUGEOT SINGLE-CYLINDER      MERKEL FRONT FORKS

throttle and spark-controlling mechanism is comprised of rotatable sleeves on the ends of the handlebars to which the grips are secured. An eccentric type crankhanger is used, which allows of the chain being adjusted independently of the belt, while the rear fork ends are drop forgings, with slots sufficiently long to accommodate a variation of  $5\frac{3}{4}$  inches in the length of the belt. Instead of securing the rear mud guards to the axles, they are bolted to upwardly extending lugs on the rear fork ends. There are similar lugs on the underside of the fork ends, to which a stand may be attached, so that the rear wheel is independent of any other part and may be removed from the frame without interference with anything but the chain and belt.

**Indian**—Whereas in 1908 the Hendee Mfg. Co. carried three models, for 1909 there are offered seven different ones. The old ones—the  $2\frac{3}{4}$  and  $3\frac{1}{2}$ -horsepower single-cylinders and the 5-horsepower twin—have been retained and in addition the Massachusetts concern has added two more twins and the  $2\frac{3}{4}$  and  $3\frac{1}{2}$ -horsepower machines with loop frames. In 1908 the company confined its frame design to the diamond type, but now it has included the loop, the division being two with diamond frames and the other five loop. Following the tendency of the times, the company has put on a 19-inch frame on the diamonds and placed the saddle on the top instead of hanging it in the rear below the top bar. This permits of easy control of the machine both in starting and when coming to a standstill. The wheelbase has been increased 2 inches and Designer Hedstrom has gone to the motor car for his rocker arm mechanical valves and his band brake, the latter having ousted the coaster type. The tires have been increased in size from  $2\frac{1}{2}$  inches to  $2\frac{3}{4}$  and there also is a larger gasoline tank, which now holds 2 gallons, while 2 quarts of oil can be carried. Magnetos are



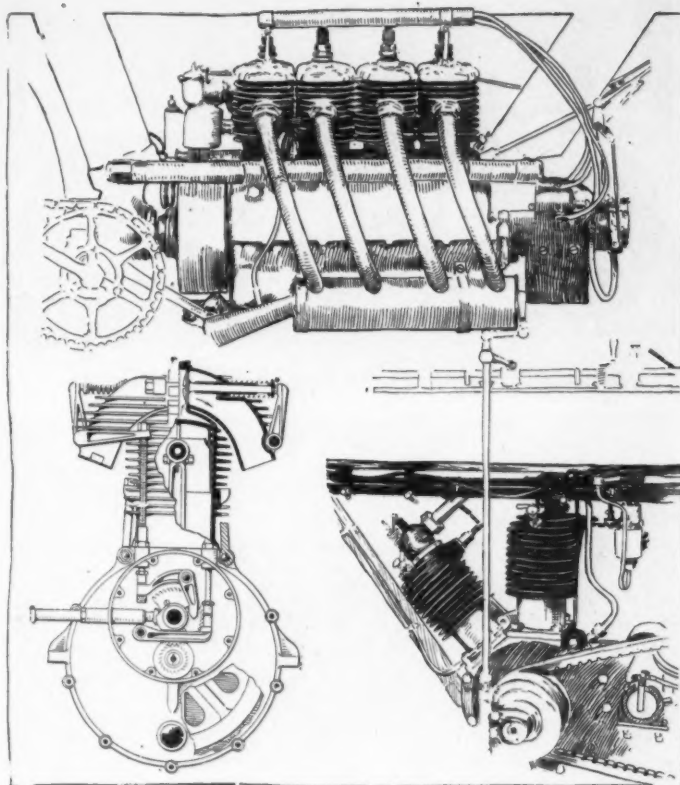
furnished on the loop twins; with the others they are optional. There is a new coil which requires only two cells to operate it. The frame has been made slightly heavier and it is double reinforced on top. An improvement is noted on the valve lifts of the twins by which they lift much easier than in the old models. Both belt and chain-drive are furnished, whereas last year only a V belt-drive was to be had. The designer has given the twin careful attention and many refinements are noted in this motor, chief among which is the mechanical valve action in which two cams are used as usual but with the exception that one cam operates the inlet valves exclusively while the other works both of the exhausts, which results in a quieter engine and more regular and even action. The cams are wider than before. A light lift rod and a little rocking lever pivoted on the dome operate the inlet valves, while with the exhaust valve-lifting mechanism a steel disk having cams formed on its two opposite edges and a toothed sector on its upper edge is pivoted by a hardened steel bushing on the projecting end of a bronze camshaft bearing. A short shaft passing through the cam case and having a bearing in both the cover and the body of the case, carries a crank lever at its outer end and a pinion at its inner end. The spark plug now is in the center of the cylinder head while the cooling ribs have been stripped from the lower third of the cylinders. Lubrication of the motor has been improved, it is asserted, by means of an oil pocket which is located at the



CURTISS MODEL OF WEHMAN TYPE OF MACHINE

lowest part of the engine base and into which the flywheel dips, and bringing about splash lubrication. In the single-cylinder line the cylinder has been inclined toward the rear and angling with the seatpost, it being claimed the motor runs quieter than when the cylinder is set vertically. The full Indian line is as follows: Loop frames—2¾-horsepower single-cylinder; 3½-horsepower single-cylinder; 4-horsepower single-cylinder; 5-horsepower twin; 7-horsepower twin. Diamond frame—2½-horsepower single-cylinder; 5-horsepower twin.

**Yale**—The Consolidated Mfg. Co. continues to pin its faith to one model and that a 3½-horsepower single-cylinder affair with a 3.5-32-inch bore and a 3¼-inch stroke and which weighs just 31 pounds. Several new ideas are to be seen in the 1909 machine, chief among which is the enclosing of the flywheel, whereas before it was outside. A one instead of a two-piece cylinder is used. The bore and stroke have been made larger, the engine has been hung lower, the wheelbase has been increased, larger tires have been fitted, the double grip control is used and there is a lower center of gravity. The method of hanging the engine in the frame is claimed as a distinctly Yale feature. All cranks and pins are forged from nickel steel, hardened and ground, while the cylinder, piston and piston ring are die-cast. The frame connections are drop forged and reinforced, while phosphor bronze bearing metal is used throughout. An I-beam connecting rod is used, while the glass oil sight is located in the right side of the crankcase. The carburetor is of the float feed type, while the coil is attached to the seat mast with the switch plug in the head. Belt-drive is used, which is adjustable by means of the rear wheel which may be moved with chain-adjusting screws. In the way of fuel capacity 2 quarts of oil and 1½ gallons of gasoline may be carried, the tank being located between the top

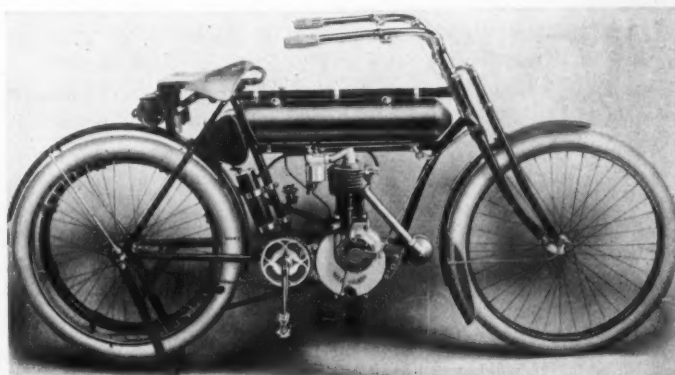


PIERCE FOUR-CYLINDER ENGINE  
ROYAL MOTOR N. S. U. FREE ENGINE CLUTCH

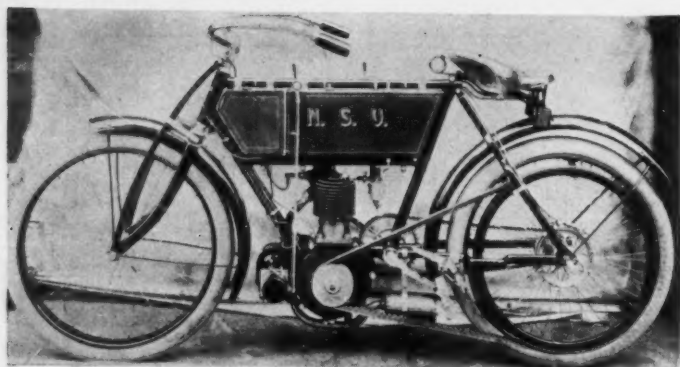
and truss bar in the frame. Splash lubrication is used. Other specifications of the Yale call for 53¼-inch wheelbase, cushion fork, 28 by 2½-inch clincher tires and a gearing of five and one-quarter to one. The weight is scheduled at 160 pounds.

**Merkel**—Both chain and belt drive are used this year by the Merkel Light Motor Co., which offers three models in the belt-driven class and as many of the other sort. Two single-cylinders, one 3½ horsepower and with battery ignition, and the other of the same power but with a gear-driven ball-bearing magneto, are to be had in the belt-drive class, while the third one is a 7-horsepower twin, fitted with a magneto. Cushion frames are used and there is a new design of front fork. V belts are used in the transmission and the lubrication is by means of mechanical force feed. The chain-driven machines come in 2¾ and 3¼ horsepower in the single-cylinder class and with battery ignition, while the third member of this group is a twin of 7 horsepower and using a magneto. Loop frame, with double top bars, spring forks and double grip control, are other features.

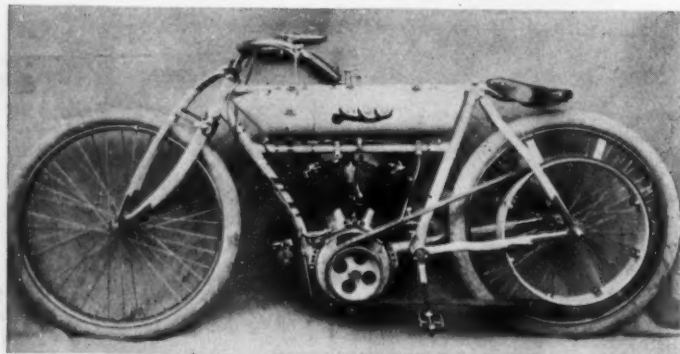
**Royal**—Magneto ignition is one of the features of the Royal Motor Works' product, a Bosch being fitted, which is driven from the motor by bevel gears. This magneto is only one of the departures noted in this machine, the designer having given his old ideas a general overhauling, the result being the Pioneer



YALE IN THE SINGLE-CYLINDER FORM



N. S. U. SINGLE-CYLINDER F. A. M. ENDURANCE MODEL



FOREIGN MACHINE, THE N. S. U. 7-HORSEPOWER RACER

model, which has a single-cylinder  $4\frac{1}{2}$ -horsepower motor mounted on Hess-Bright ball bearings and with  $1\frac{1}{2}$ -inch mechanical valves located in the head. There is a new type of valve-operation mechanism which allows of adjustment of the clearance which tends to easy action and long life. A combination centrifugal feed and splash system of lubrication is employed, there also being an auxiliary cylinder oiling system which is permitted by the special piston construction which has an internal shelf. The piston itself has a dome top. Transmission is had by means of a 1-inch V belt, while the frame is of the modified drop type. The spring fork is luxurious, while the gasoline and oil tanks are separate but telescoping and made of seamless brass tubing with topedo ends. Because of the crankhanger bracket being adjustable or detachable, it is possible to alter the frame height by 2 inches and also to have an independent chain adjustment.

**N. S. U.**—Chief among the new features of the N. S. U. is a two-speed gear hub with a band and internal expansion brake, which is adapted to use on tri-cars and delivery vans. The line has several additions this year, one of them being a 3-horsepower twin with mechanically-operated valves and  $2\frac{1}{2}$ -inch bore and 3-inch stroke. The carbureter, mechanically controlled by the handle bar, is placed between the cylinders and it is possible to manipulate the exhaust lift and internal expanding brake on the back wheel without releasing the grips. In the touring models there are found single-cylinders of 3,  $3\frac{1}{2}$  and  $3\frac{3}{4}$  horsepower and twins of 4, 5 and 6 horsepower, each with a folding stand that can be converted into a baggage carrier. In the F. A. M. endurance models there are singles in 3 and  $3\frac{3}{4}$  horsepower and a 6-horsepower twin. The lightest machine of the lot weighs 80 pounds and is fitted with a  $1\frac{1}{4}$ -horsepower engine.

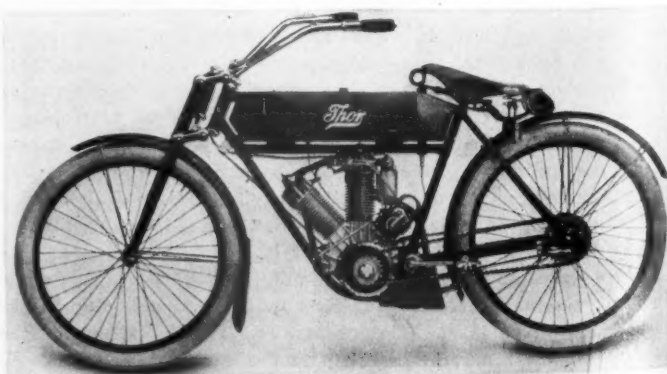
**Curtiss**—Promised as a surprise for the show is something entirely new in the shape of a three-cylinder Curtiss motor cycle of 10 horsepower, with the cylinders set at an angle of 50 degrees, with the exhaust and intake on the side. Outside of this, though, the usual Curtiss construction is followed. Another new model planned for the show is the Wehman type, which is somewhat of a departure from the Curtiss company's line, although it employs the trussed frame and fork. The Wehman will be equipped with either a  $3\frac{1}{2}$  or 7-horsepower motor, the latter having  $3\frac{1}{4}$ -inch bore and a  $3\frac{5}{8}$ -inch stroke. An extremely low

frame is used and the gasoline tank is so sloped at the rear that it does not interfere with the saddle position. A separate oil tank is used. In addition to the two new ones the company will show its two regular models, one of them with a 3-horsepower single-cylinder engine and the other with a 6-horsepower twin. These come with 22-inch frames, but the company gives an option of a 17-inch. Either 26 or 28-inch wheels are fitted. Among the new things in the Curtiss machines is a muffler and ejector, while the company is giving a very low saddle position and a new design of V-shaped handlebars on which Rough Rider grips are furnished as regular equipment. The motors, as before, are roller-bearinged throughout and in addition a new form of piston pin construction has been adopted. In this a hollow piston pin is held in the end of the rod and a liberal bearing is had. A new V belt transmission has been designed and the rear fork stays have been made a trifle heavier. Stronger cable and casing are used in the grip control system. The Eclipse coaster brake will be fitted and all through the line there has been a general improvement and refinement in details.

**Walton**—Three models will be shown by the Walton Motor Co., the feature of which is a channel girder frame, which is divided into compartments or lockers for tools, batteries and coils. Also there is more room for gasoline and oil, the usual capacity being doubles. The frame is low-built and with the motor well forward, while spring foot rests are used in place of pedals. A pulley made by the Walton company is adjustable, giving eight adjustments, the gear ratio being changed by running the belt off, pressing the flange back and turning it around until the slot desired is opposite the peg. The belt keeps the peg up in the slot.

**F. N.**—The Ovington Motor Co. imports the F. N. and its Big Four model has been designed especially for use in this country. For this year it has a larger engine, lower frame, a larger magneto and heavier rims and tires. It will divide honors in the four-cylinder division with the Pierce, developing 5 horsepower. Shaft drive through bevel gears is used and the front spring is compound and shock-absorbing. A float feed carburetor is used. The control is by single grip practically, with an ignition-inter rupting switch in the left grip and the spark advance and throttle on the frame. There are two brakes, one an internally-expanding drum applied by back-pedaling, while the other is an emergency of the Bowden type. The weight of the machine is 185 pounds.

**Reading Standard**—A variety of models is offered by the Reading-Standard Co., the line consisting of loop and diamond frame motor cycles, delivery vans and tandem, tricycle and chair car models equipped with single and twin-cylinder motors ranging from 3 to  $7\frac{1}{2}$  horsepower. Both belt and chain-drive are offered on all the loop frame models with but one exception. In the diamond frame type only chain-drive is offered, this line consisting of a single-cylinder of from 3 to  $3\frac{1}{2}$  horsepower; a single-cylinder tandem of the same power; a 6-horsepower twin tandem and a mate to this in the individual type. The loop frame type of which there are three models, has the new R-S mechanical intake valve motor, one of them a single-cylinder of 3 to  $3\frac{1}{2}$  horsepower; another of 4 horsepower and single



TWIN-CYLINDER OF THE THOR TYPE

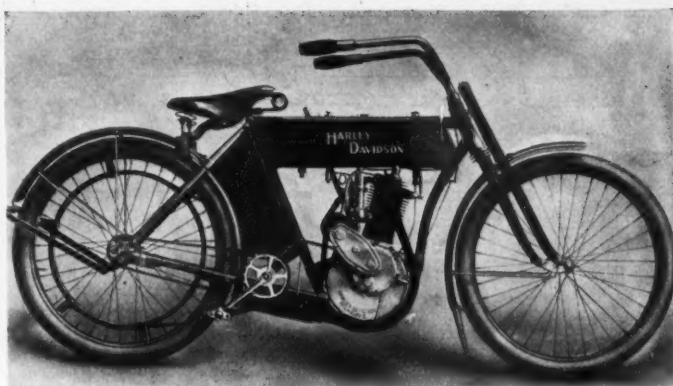


cylinder and the third a 6-horsepower twin. Model 4 is a 7-horsepower twin. In the line of triecycles there are two, both fitted with chain-drive only, one of them a 3 to 3½-horsepower single-cylinder machine and the other a 4-horsepower single-cylinder. Magnetos are fitted extra.

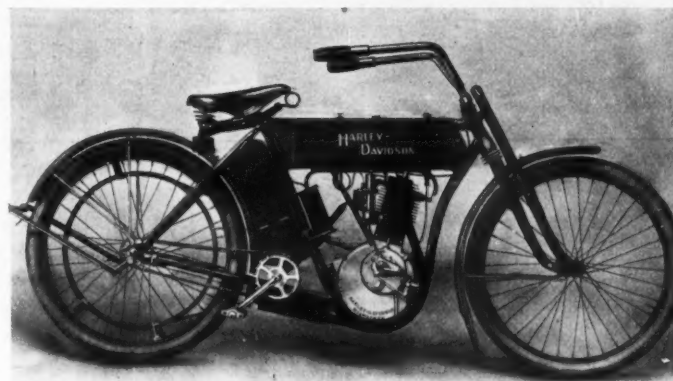
**Thiem**—The Thiem company makes a single-cylinder with a 2¾-inch bore and a 3¼-inch stroke, with double grip control and a 20-inch frame. A V belt is utilized for the transmission of power, the belt being waterproofed and oiled and the layers fastened by copper rivets. Two clamps at the base and one at the head hold the motor in place. Lubrication is by force pump, which is located in the tank, so there are no valves to work. The wheelbase is 52 inches.

**Harley-Davidson**—Among the changes noted in the Harley-Davidson is the adoption of a double grip control. This, however, is not the only new thing offered, there having been several new models added to the line, which now numbers five, including one twin. There has been a modification of the transmission system, with the standard being a flat belt drive with an option on a V belt. Then, too, the designer has met the demand for a low position by dropping 1 inch. In wheels 26-inch is offered in addition to the usual 28. The twin is furnished with magneto ignition only and the engine is of 7 horsepower. In the motor the aim has been to get away from vibration and noise, considerable attention having been given to the flywheel, cylinder and valve. The 19-inch frame has a double top bar and steel steering head, the lower tube of the double top bar being brazed directly into the steel steering head. All joints are reinforced. The motor is fastened in the loop by clamps brazed on the frame, but is not a part of the frame. The principle of the cushion fork remains the same, but the company has refined it, the forksides, which contain the springs, having been increased 1 inch in diameter, which permits of the use of larger and more flexible springs. The bearings in the rocker plates have been enlarged and the design changed so the front wheel may be removed by loosening two nuts on the rocker plate studs. There has been a segregation of the oil and gasoline tanks and now the oil tank is located in the space between the upper and lower top bars of the frame, while the gasoline is carried in a tank that completely covers the top bar. The Harley-Davidson line consists of model 5, a 4-horsepower single-cylinder with 28-inch wheels and battery ignition; model 5A with magneto ignition; model 5B with 26-inch wheels and battery ignition; model 5C with the same size wheels and magneto ignition, and model 5D, the twin, which is 7 horsepower and with magneto ignition only.

**Torpedo**—While the Hornecker Motor Mfg. Co. has introduced several new ideas into its 1909 construction it still sticks to chain-drive and 26-inch wheels. In support of these, the designer claims that with chain-drive there is no lost power, that there is no chance for a chain slipping and that it is cheaper and more durable, while 26-inch wheels are easier on the engine because they do not require so much power, while there is just as much resiliency. Also tire cost enters into the proposition. The company claims to have introduced the 26-inch wheel into motor cycle construction in this country. In the way of changes the model B has an improved handle bar and



ONE OF THE NEW HARLEY-DAVIDSONS

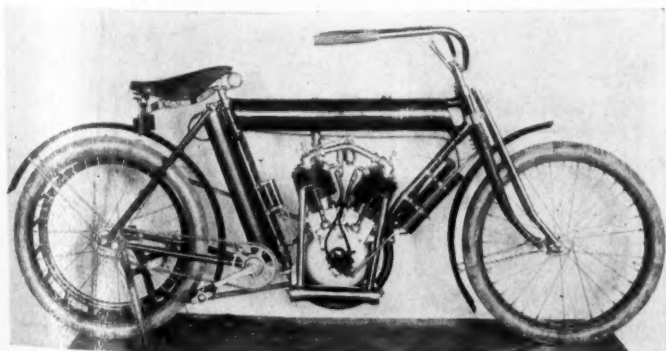


TOURING TYPE OF THE HARLEY-DAVIDSON

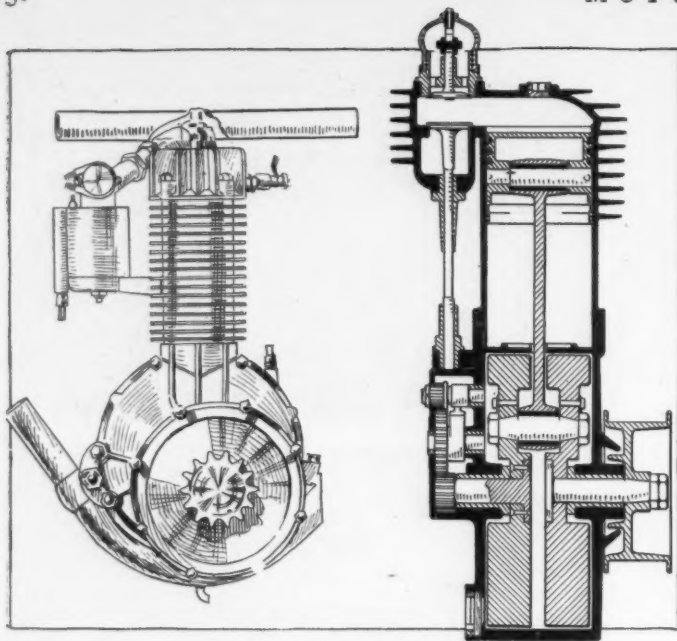
grip control; so has model C, which also has a new muffler. The model G single-cylinder and model F twin are new ones just added to the line. The company uses Thor motors ranging in power from 2¼ up to 5 on the twin. The latter has a bore of 2¾ inches and a stroke of 3¼. The Thor carburetor also is used, while the frame is a low loop with a double top bar and 20 inches in height. This loop frame gives a low saddle position which permits of easy starting and also allows the rider to come to a stop in traffic without the necessity of dismounting. The transmission is by direct chain-drive on a compensating sprocket and a ⅝-inch pitch roller chain. On two of the single-cylinder models the wheelbase is 50 inches and 51 on the others. A patent spring fork is used and the lubrication is secured by means of a Torpedo force feed oil pump. Model B weighs 125 pounds, model C 130, model G 145 and model F 150. The tank is a four-in-one combination, providing for 5 quarts of gasoline, 1 pint of oil and three standard-size batteries and coil.

**Crouch**—The 3-horsepower single-cylinder model made by the Crouch Motor Co. has an engine with a bore of 3 3/32 inches and a stroke of the same, the inlet valve being automatic, while the exhaust is held by a removable guide, radiation keeping the spring cool. A double belt drive is employed, which is regulated by means of a special belt and idler regulator. Grip control is fitted and the feature of the frame is the forks of special truss construction and with a heavy arch crown. Jump spark ignition is had by means of a coil and batteries.

**Armstrong**—Six different models of Thor motor cycles will be shown by the Aurora Automatic Machinery Co., ranging in horsepower from 2¼ to 6. Three of these are single-cylinders of 2¼, 3 and 3¼ horsepower, and the others are twins—all 6 horsepower, two of them with geared transmission and the other using a belt. Prominent among the Thor features is the loop frame, which permits of the coveted low position, the top of the saddle being only 31 inches from the ground. A new Thor idea is a clamping device for holding the seat post, which allows of quick adjustment for height and which is designed to overcome the twisting of the seat post. The Aurora spring forks and the Thor pneumatic cushioned forks have been improved in design, the Thor giving



ARMAC, SHOWING FUEL SUPPLY TANKS



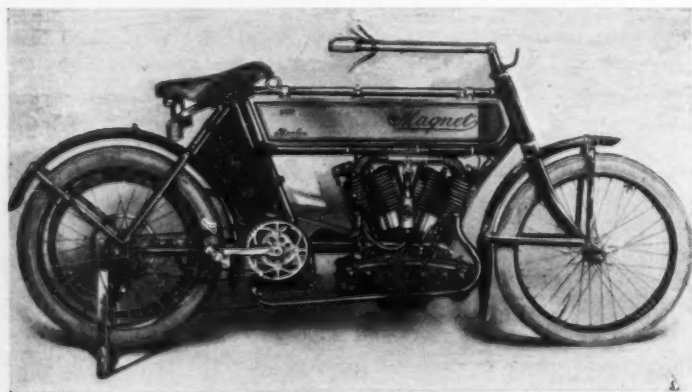
THOR AND YALE MOTORS

a greater range of action by having the stroke of the piston increased 50 per cent and having the various parts adjustable. Wear at the hinged joints is avoided, it is claimed, by the use of ball bearings. V shape handle bars are used, with an option on the new Thor Standard. There is an entirely new oiling system and the size of the exhaust valves has been increased. On the belt drive model is an arrangement for the protection of the rider from splashing oil, and the shaft to which the motor pulley is attached will run in a double set of roller bearings. Magneto ignition models are so arranged that the motor and magneto are practically a unit, the magneto being built in the base of the motor. The frame of the Armac is made of seamless steel tubing with the gasoline and oil tanks integral, while the size of the wheels is optional, either 26 or 28-inch being offered. In the way of tires 2½-inch are furnished, while the low position is secured by means of a long drop seat post. The company retains its V belt drive, while ignition is by means of three dry cells carried in a fiber casing with an Armac two-lead coil. The spark plug may be placed in either the top of the cylinder or in the intake chamber. The motor is of 6 horsepower with a 3-inch bore and a 3½-inch stroke, while lubrication is by force feed pump.

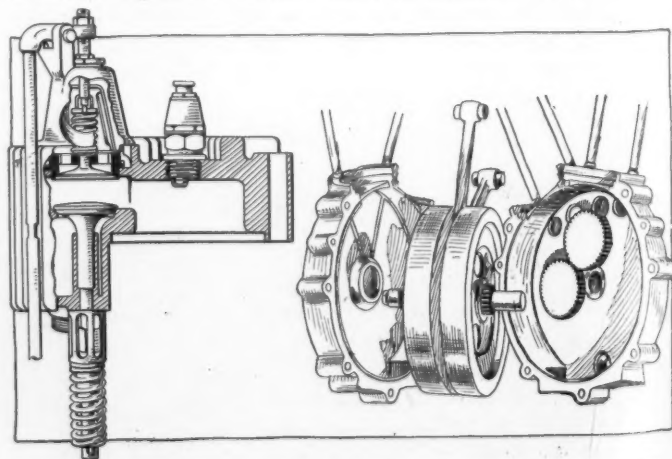
**New Era**—Radical departures from conventional motor cycle construction are found in the product of the New Era Gas Engine Co. In the first place the machine is not equipped with pedals; then again the motor is started by means of a crank, while in addition to these novelties a friction clutch is employed and a two-speed gear fitted. Being thus equipped there is a great deal of similarity between the New Era and a motor car. Dispensing with the pedals has brought about the introduction of a small platform on which the feet are placed. On the footboard

of this platform are the two levers which connect with the transmission and which are operated by means of the rider's feet. This does away with any necessity of taking the hands from the handle bars, for on the same footboard is the brake lever, while there also is a button which permits of cutting out the muffler. Control of the gas and spark is from the grips of the handlebars. Because of the two-speed transmission it is possible to allow the engine to run while the machine is stationary and which is appreciated best when running through crowded traffic where frequent stops are necessary. The motor used is a single-cylinder affair of 3½ horsepower, the power being delivered to the rear wheel by means of a single ⅝-inch pitch roller chain ¼ inch wide. A fiber pulley prevents slapping at high speeds. On low speed the gear ratio is fourteen to one and on the high four to one. On the high the drive is direct by chain to the rear wheel and when the high speed clutch is thrown in the transmission practically becomes one unit, the clutch case, gears and front sprocket revolving together at the same speed but with the gears stationary, the gears revolving around the motor shaft with the case but not on their own axes. The New Era people are using an internal expanding brake which works on the rear wheel and when it is applied the motor is automatically disconnected from the driving wheel. In the engine construction it is noted that the single-cylinder has a solid head made of one casting and requires no packing. The intake valve is of nickel steel in one piece, while the exhaust is of cast iron with a steel stem. The carburetor is of the float feed type. A sight feed oiling system is used. The frame is a compromise drop, a combination of the good qualities of both the diamond and the woman's frame. This permits of the use of a novel saddle which is in reality a form seat made from pressed sheet steel and upholstered with a hair and leather cushion. The 2½-inch tires are detachable and are fitted with either single or double clinch steel rims.

**Magnet**—Although the Magnet will not be shown at New York it will be on exhibition at Chicago, where the Magnet Motor Co., which imports the machines from Germany, has taken space. There are three models in the line—a 3½-horsepower single-cylinder, a 5½-horsepower twin and a 2¼-horsepower lightweight, the last named with 24-inch wheels and weighing only 95 pounds. One of the features of this machine is the employment of make-and-break magneto ignition which is part of the regular equipment. The drive of the magneto is by the gears which operate in oil. A spray carburetor also is fitted, the air being regulated by hand instead of being automatic. The level of the gasoline may be noted through a window. The single-cylinder 3½-horsepower motor has 3⅝-inch bore and 3¼-inch stroke, the inlet valve being mechanically operated and placed just over the exhaust valve, which is designed to prevent overheating. The ground cylinder is one-piece and has an explosion head, eliminating joints and packings. The saddle is low-hung, being only 30 inches from the ground, while the rear mud guard is hinged to facilitate repairs to tires. The wheelbase is 55 inches and



OF GERMAN MANUFACTURE, THE MAGNET TWIN



INDIAN VALVES AND CRANKCASE INTERIOR SHOWING OIL RESERVOIR AT LOWEST POINT

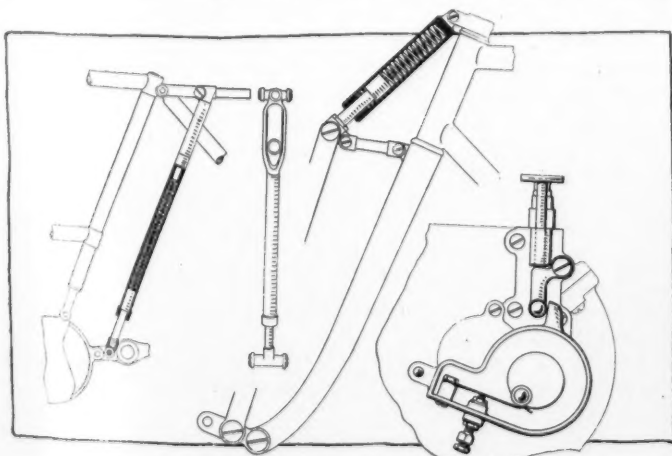


2½-tires are fitted. Only one lever is used in the control, that working the throttle. The spark is handled by means of a button on the right grip, while on the left handle is a valve-lifter to be used in starting. Drive is a 1½-inch V belt and there is also a variable pulley which gives any desired gear ratio. When ordered a friction clutch is fitted. In the way of brakes there are two, both band. One of the unique devices which is part of the equipment of the Magnet is a self-starting stand. The rider mounts his machine, pedals a few strokes until the motor is running, then steps on a lever which sends the machine off the stand and the motor cycle is under way.

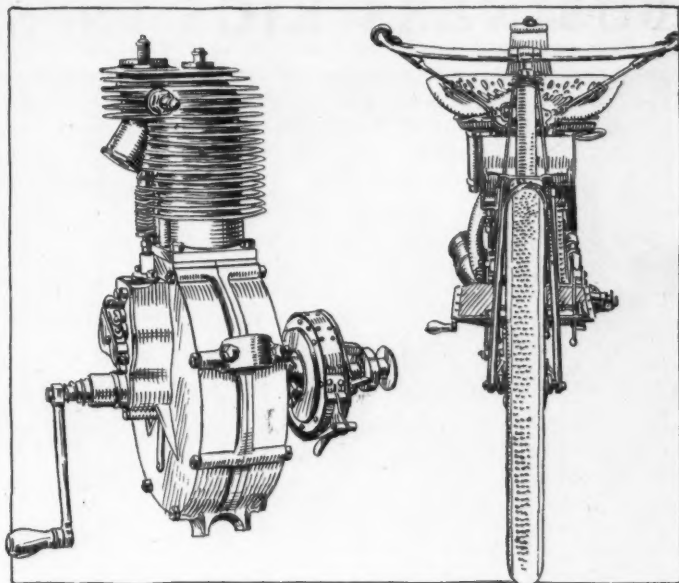
**Eclipse Brakes and Hubs**—The Eclipse Machine Co. will not show a motor cycle for the reason it does not build one, but it will have its line of coaster brakes and hubs designed for use on motor cycles. The Eclipse coaster brake is a heritage from the bicycle and adapted to the motor cycle. For 1909 the company has made so many improvements that it can be called a new brake throughout. One of the improvements adopted is the use of cork dust washers in the coaster brake which have taken the place of felt washers. A new idea is the Eclipse front hub with a knock-out axle. The hub is turned from solid bar stock, with the balls turned and ground in the ends. The balls are ¾ inch and held by Star retainers. The bearings are protected by felt dustproof washers. In the knock-out axle it is noted that the cones screw on an inner quill threaded accurately to a wrench-tight fit. The axle slips through the center of this quill and can be removed by taking an axle nut off one side, which permits of the removal of the front wheel without springing the forks over the end of the axle.

**F. A. Baker & Co.**—The exhibit of F. A. Baker & Co. will consist of a line of motor cycles and accessories. The concern will show the Indian and Pierce, for which it is the distributor in Greater New York and Long Island and in addition it will have the specialties of the Persons Mfg. Co., the accessories of the Majestic Mfg. Co., the Corbin motor cycle brake, the Continental Erie Co.'s tubes and a line of domestic and imported novelties.

**Greyhound**—While two models of the Greyhound will be shown by the Auto-Bi Co., there is great similarity between them, the only difference being a variation in the saddle mount. Not many changes have been made, the most important probably being the addition of the Greyhound shock absorber. There has been a refinement of control parts, while the timing device has been made dust-proof. The spring fork also has been rebuilt and made more substantial. In general the specifications call for a 21-inch frame, 2½-inch tires, 56-inch wheelbase, Auto-Bi chain and leather belt transmission and a weight of 140 pounds. The motor is a single-cylinder and of 3 horsepower, with a bore of 3¼ inches and a stroke of the same. Ordinarily dry cell ignition is furnished, but a Bosch magneto is offered as an extra equipment. The motor is hung very low and the cylinder and head are cast in one piece. The engine base is split horizontally and the motor can be taken apart without removing it from the frame of the machine. The



GREYHOUND SHOCK ABSORBER, FRONT FORKS AND TIMER AND EXHAUST LIFT

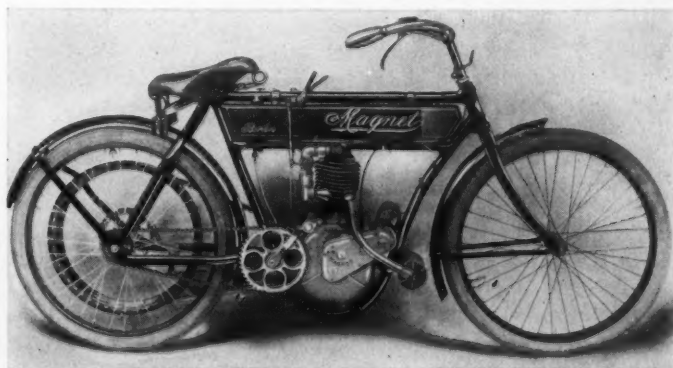


NEW ERA CRANK AND SADDLE

crankshaft is a one-piece solid forging. The timer actuates a roller which relieves the compression on the engine. The theory of the new shock absorber is that the rider's weight being suspended on springs, the machine rises when an obstruction is encountered, the rider remaining practically stationary because the jolts are taken up by the spring. This construction, it is claimed, does not in any way interfere with the rigidity of the frame.

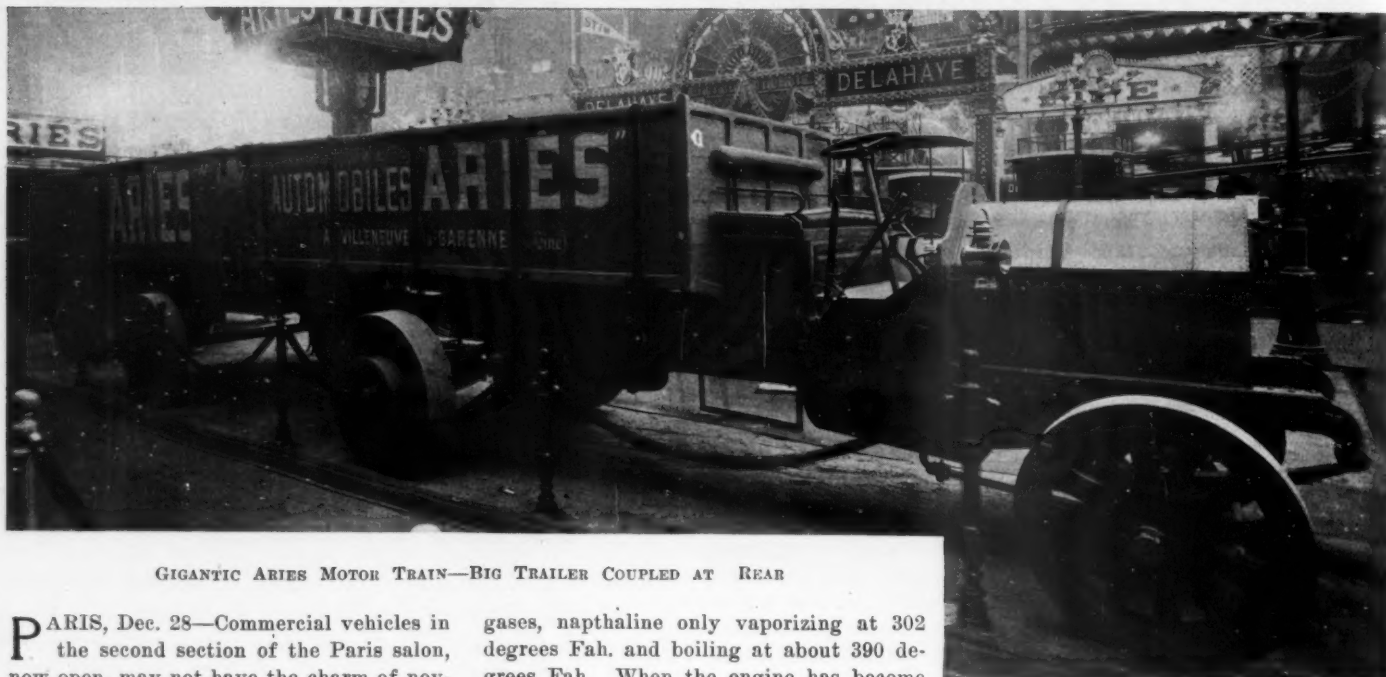
**Peugeot**—The Peugeot is a French machine which is imported on order only and for which much is claimed. Chief among these claims is that there are fewer parts in the Peugeot motor than in any other engine, the cylinder and head being cast in one piece. The exhaust and inlet parts are large, while the shafts are of hardened steel working in large bronze bushings. The crankcase is an aluminum casting, while a Longuemare carbureter is fitted. A Bosch magneto may be used, in which event the drive consists of a set of rawhide gears running in oil. The Peugeot motor comes in three sizes—3½, 5 and 7 horsepower. The 7-horsepower is a twin.

**Mesinger Saddles**—Not many saddle concerns will be found in the motor cycle section but the H. & F. Mesinger Mfg. Co. intends displaying its line, which consists of five saddles which have been designed especially for use on the two-wheelers. The feature of the 1909 Mesinger motor cycle saddles is the shock absorber attachment which checks the rebound and prevents side play. In this, the side bolt on the shock absorber is threaded into the side plate, and a nut on the inside of the plate locks the bolt to prevent loosening. The shock absorber is adjusted to the weight of the rider by opening the lock nut and setting the bolt as desired, after which the lock nut is tightened again. The hinge joint on the front spring is designed to prevent breakage and to add to the life of the spring. There are three models of Mesinger Cavalry saddles. Each of these is fitted with a shock absorber and differ from each other only in size.



MAGNET LIGHTWEIGHT, 95 POUNDS, 2¼-HORSEPOWER

## BUSINESS RIGS IN SECOND PARIS SALON



GIGANTIC ARIES MOTOR TRAIN—BIG TRAILER COUPLED AT REAR

PARIS, Dec. 28—Commercial vehicles in the second section of the Paris salon, now open, may not have the charm of novelty, but they are not lacking in interest to those who have taken the trouble to follow such movements. New departures are somewhat rare, and at this time of the day, indeed, it would be rather difficult to get an altogether new system on the market unless it possessed obviously superior qualities. Steam has a smaller representation than ever before, and at the show appears to be less important than it really is, for Darraeq-Serpollet and Purrey, the two most important French firms in this line, are absent from the salon.

### One Newcomer, the Johnson

There is one newcomer in the Johnson, a French production with British capital behind it, and another one in a steamer for the Renard Trains Co. The only other steam vehicles in the show are shown by the Chaboche company.

A rotary air-cooled motor using solid blocks of naphthaline as fuel is one of the few novelties at the salon. The motor itself is not entirely new, being a Burlat, which has occupied a position on the market for the last 2 years. The cylinders are disposed in the form of a cross, with pistons connected up to a two-throw crankshaft. For starting up it is necessary to use gasoline, and continue running on it for about 10 minutes before switching over to naphthaline. During this period the exhaust gases are being led through a pipe forming a jacket round a tube passing through the naphthaline tank. At a heat of 176 degrees Fah. the solid blocks of naphthaline liquefy, the liquid being led down the jacketed tube to the carbureter and treated in practically the same way as gasoline. To carburate it, however, the liquid must be still further heated, and on this account all the intake piping is jacketed to receive the heat of the exhaust

gases, naphthaline only vaporizing at 302 degrees Fah. and boiling at about 390 degrees Fah. When the engine has become sufficiently warmed up to vaporize the liquid the driver switches over by merely carrying the throttle further round on the sector, one-half of which gives his full range for gasoline, and the other half for running on naphthaline. The act of opening out the naphthaline supply closes off the gasoline flow. Lower cost of running is claimed for the naphthaline engine, the difference being said to be as great as 60 per cent. The method of converting naphthaline into a solid block is one that is kept secret by the constructors of the rotary motor. It is declared, however, that the blocks do not consist of pure naphthaline, it being possible to incorporate other hydrocarbons with it without any deposit being left. The engine and its special fuel have been produced by the Societe des Camions a Moteurs Rotatifs, of Lyons.

### Truck With Rotary Motor

An interesting feature of the truck fitted with a rotary motor is the method of suspension, all the organs, comprising engine, clutch, gearset and countershaft, being mounted on a subframe attached above the mainframe by inverted semi-elliptic springs in front and a single coil spring at the rear. The suspension of the mechanism is thus at all times independent of the main springs, whatever the load carried. Delahaye also makes special provision for easy suspension of the motor and transmission on all trucks by employing two sets of springs all round, a lighter set being placed immediately above a much heavier set. When running empty the weight of the vehicle is carried entirely on the upper and lighter springs, the lower and heavier ones only being brought into operation when the vehicle is under load. Experience has shown that a 5-ton truck, with sufficiently

powerful springs to carry that load, is very destructive of machinery when run light at an increased speed; hence the attempt to give two sets of springs, one for light traveling and one for full load.

A distinctive type of commercial vehicle was shown by the Stoller company, of Bale, Switzerland, the motor consisting of a single horizontal cylinder with opposed pistons connected up to the crankshaft carried below the pistons and in the horizontal plane of the vehicle. The method of connecting is by balance levers and three connecting rods. The combustion chamber is an outstanding port midway in the cylinder, with an exhaust valve in the head and an inlet valve in the base of the chamber. Engine dimensions are 7½ inches diameter by 5.7-10 inches stroke for each piston, the total stroke of course being double this. Ignition is obtained by a low-tension magneto. The two-cylinder engine being placed across the forward end of the frame, the radiator being to the rear of it, accessibility is perfect. In the fore-front of the engine is a horizontal shaft carrying the cam-operating mechanism, the gears for driving the lubricator and water pumps, and the governor, all laid bare by removing a single inspection plate with bayonet clasps. Further, the connecting rod ends can be got at by the removal of a plate at each end of the cylinder. From a metal-to-metal cone clutch the drive is taken to a six-speed gearbox, with gears always in mesh. A feature of this is that the same six forward speeds can be used for the reverse, there being a right and left crown bevel on the countershaft, forward and rear drive being given according to which bevel is slid into mesh. Final drive is taken to the rear wheels by means of side chains.



Speed being the most destructive factor in commercial vehicles, there has been a serious attempt on the part of constructors to make it impossible for drivers to travel above a certain fixed rate. Governors cutting off the gas supply when the engine reaches a determined number of revolutions are a feature of about three-quarters of the heavy vehicles in the show. On the Saurer trucks there are two engine speed limitations, a high one when the vehicle is being run on any of the low gears, and a lower one as soon as the driver slips into top direct drive. When running on the high the driver has only half the gas supply available with the engine in low gear.

Girder frames are a distinctive feature on all the heavier trucks, this type having the advantage of lower cost compared with the pressed steel frame, and also permitting some very advantageous attachments of the different mechanical organs. There are three distinct types of final drive: by double side chains, by propeller shaft, and by transverse cardan shaft, with internal gearing, on what is generally known as the de Dion principle. Above 2-ton loads the chain drive unmistakably holds premier position, experience having shown that the considerable non-suspended weight of a live axle car is not at all conducive to long service. As in the pleasure car class, there has been an abandonment of the low-tension magneto for commercial vehicles in favor of the high-tension magneto only; in the majority no standby in the form of storage batteries is provided.

#### Taxicab Tendencies

Taxicab experience is that two cylinders are sufficient, at any rate for the generally fair street conditions of European cities. There are plenty of four-cylinder cabs intended for the heavier work at railroad depots. One is shown by the Fiat company, with a bore of 3.1 and a stroke of 3.9 inches. The cylinders and upper half of crankcase are produced in one casting. At every other stand the taxicabs shown have two cylinders carried under

a forward bonnet, cooled by thermo-syphon circulation, and having high-tension magneto for sole electric supply. Among these were Renault, Charron, Panhard, Berliet, Peugeot, Delahaye, Cottin-Desgouttes, Dietrich and Unic. So convinced are cab companies of both London and Paris of the superiority of the two-cylinder cab that in all cases where both models have been taken it is the two-cylinder vehicle that is being ordered in increased numbers to the neglect of the four. The principal reason for this choice is the lower fuel cost with the twin-cylinder car, and in a smaller degree the decreased cost of upkeep. The objection that anything short of four cylinders is not sufficiently supple or silent has now been removed.

De Dion goes further and has been very successful in the introduction of single-cylinder taxicabs for London and Paris, the engine being a model with a bore and stroke of 3.9 and 5.1 inches, nominally rated at 10 horsepower. Being remarkably well balanced, there is no more vibration than on the average four, and in city traffic they are not distinguishable by their noise, it is asserted.

#### Motor Car Fire Engines

Motor car fire engines are a well developed class, for the authorities in all large European cities have become convinced that better work can be done by the internal combustion motor than by horses. Delahaye showed two distinct types, both of which have been adopted by the city of Paris brigade, which has recently decided to abandon all horses. The smaller engine has as its power plant a four-cylinder motor of 2.9 by 4.3 inches bore and stroke, carried forward and driving to the rear wheels through a three-speed gearset and propeller shaft. This engine, known as the first-aid wagon, carries with it 90 gallons of water, which can be turned onto the fire immediately the vehicle comes to a standstill and while connection is being made to the street mains. Including the driver, only five men are needed, and the engine can get away so much quicker and

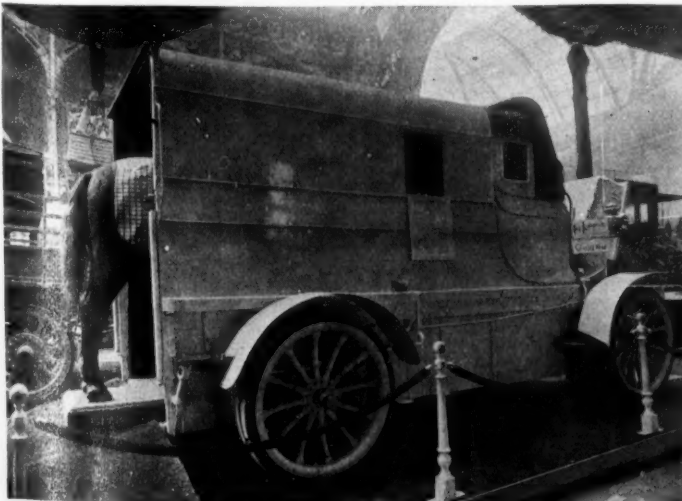
work its way through the city streets with so much facility that frequently it extinguishes a fire before the larger outfit gets on the scene. The rule in Paris is to send out the first-aid engine when a call is made and let it be followed by the large engine a few minutes later.

#### Fiat Has a Fire Engine

Fiat has a four-cylinder fire engine established to meet the requirements of the Milan brigade, the motor being a 30-40-horsepower model, driving to the rear wheels through side chains and operating the centrifugal pump by means of a single chain geared off the mainshaft. For use in large cities, where a good supply of water can be assured an engine is constructed with two independent motors, one being used for driving the vehicle and the second connected up direct to the pump.

Tip wagons, designed for use in the building trade, and for public service works, have been produced in large quantities. One of the most interesting in this class is shown by Delahaye, the metal body being mounted on small wheels running on rails, the ends of which curve downwards at the rear. By means of a low-reducing gear the truck can be wheeled out to the end of the rails and necessarily tipped, owing the curve of the rail. The double-reducing gear allows one man to operate the body even when carrying its full load of 5 tons. The Stim company shows a wagon of a similar type, in which the body is carried out to the extremity of the rails by means of chain and low gearing, then tipped by a separate lever with a powerful band brake, allowing the movement to be stopped at any position. Rossel shows self-tipping wagons, the body being pivoted so that the rear will always be slightly heavier than the front under load; thus on releasing a pin the load will be dropped out behind; yet the body can be raised to its primitive position by one man.

Heavy city omnibuses have always been found a difficult class to fill, the load being great, speed comparatively high, and



FRONT-DRIVE LATIL, USED FOR TRANSPORTING RACE HORSES



LORRAINE-DIETRICH 24-HORSEPOWER MOTOR BUS

regularity essential. Of the types suitable for service in Paris and London there are very few examples, the only one really fitted out for this work being an Aries. The Renault Brothers show a special bus designed for the General Omnibus Co., of Paris. It is one of the single-deck type, only a small number of which are kept in service in Paris, and, although following standard Renault design, is special construction throughout. The frame, a very deep pressed steel channel section type, is adequately strengthened by cross members and angle members at the rear. The engine, a 20-30-horsepower type, is carried forward under the usual Renault bonnet, with plain tube radiator on the dash. Clutch, gearbox and final drive by rear live axle all follow of standard design, though naturally very considerably strengthened for their special work. Instead of being at the right, the driver is placed at the left hand side of the vehicle, his brake and change speed levers being in the center. The exhaust is carried upwards above the roof of the bus, in the usual city of Paris style, but at the base of the vertical length of piping is a bypass allowing the hot gases to be turned into a foot warmer running down the floor of the bus. In place of the solid block tires usually employed on the Paris buses Michelin pneumatics are used, triples being mounted on the rear and twins on the front wheels.

#### Special Vehicles Shown

Plenty of special vehicles are shown for distinctive classes of work. Thus Delahaye has a light disinfecting van employed in the Sarthe district for cases of infectious diseases, the work of disinfecting linen, bedding, etc., being done at the door of the patient's house. The same firm has a motor car hearse, with a coupe body immediately behind the driver, and compartment for the coffin at the rear. Berliet shows a special meat wagon, which has been used during the last army maneuvers to supply fresh meat to an entire army corps. The chassis is a standard 22-horsepower model, on which changes have been made from low to high-tension ignition, and from pump to natural water circulation. The body, a capacious one opening at the rear, is lined with metal, fitted with hooks for hanging meat and supplied with a ventilator.

For carrying race horses from their stables to the course the Front-Drive Latil Co. showed one of its models with four-cylinder engine placed across the forward end of the frame, connecting up to the front wheels by means of universals and pinion engaging with internal gear on the road wheels. The absence of machinery at the rear makes it possible to fit a low, easily entered body specially designed to accommodate two horses. Military and city ambulances are plentiful and, although there is considerable ingenuity shown in fitting up the interior to the best advantage, the chassis employed in all cases are standard models.

## ONE MORE MOTOR PATH

### Hoosier Tradesmen Formulate Plans for 26-Mile Loop Speedway Near Indianapolis

Indianapolis, Ind., Jan. 11—After working on the project quietly for several months, Carl G. Fisher, treasurer of the Fisher Automobile Co., has announced plans for a 26-mile racing course to be located northwest of the city near Riverside park. There have been rumors for the last 6 months that such a course was proposed for Indianapolis but publicity of plans was withheld until options could be gained on ground and deals for their purchase closed. It is announced that an oblong tract, 1 mile long by  $\frac{1}{2}$  mile has been obtained and that work will begin soon on making the 26-mile track.

The plans for the course are rather original. It is the idea to have a 2-mile track at the outer edge, then wind snake-like toward the center, making a 26-mile course in all. An immense amphitheater will be erected, from which it will be possible to watch all portions of the course.

During the race meet at Savannah, Ga., recently, Fisher presented his plan to a number of motor car men and succeeded in interesting them in the Indianapolis project. It is understood that practically all of the capital stock of the proposed company has been subscribed, Fisher, James A. Allison, of the Prest-O-Lite Co., and George M. Schebler, of Wheeler & Schebler subscribing for \$15,000 worth of stock each. It is the intention to bank the numerous long and short turns of the course in such a way that the greatest speed will be possible and it is said the track will have the additional advantage of not requiring it to be policed to any great extent. It is also the intention to use a part of the proposed course for a balloon park and plans are already under way for having the next international balloon race start from Indianapolis next summer. To arouse interest in ballooning

the Aero Club of Indiana has just been organized with Fisher as president; Charles Stone, vice-president; Dr. Goethe Link, secretary; R. J. Irvin, treasurer, and R. H. Hassler and B. W. Twyman as directors.

The proposed course is located in a place that will be easy of access from Indianapolis and Chicago. It is on the Chicago division of the Big Four railroad and on the Ben Hur traction line, running into this city. Improvements to cost \$250,000 will be made, and included in the plans is a union station at the junction of the two railroads.

### COIL MAKERS WILL FIGHT PATENT

New York, January 11—The Allied Coil Manufacturers' Association is the title of a new organization that came into being as the result of a meeting held at the Prince George hotel by a number of representative coil manufacturers who were exhibiting at the palace show. The officers are: President, Frank Brandow, of the Jacobson-Brandow Co., Pittsfield, Mass.; vice-president, C. B. Byrne, of the Kokomo Electric Co., Kokomo, Ind.; treasurer and secretary, John O. Heinze, Heinze Electric Co., Lowell, Mass. The executive committee of the association is composed of the foregoing officers, in addition to the following: Charles F. Splitdorf, Splitdorf Laboratory; F. A. Wood, National Coil Co., Lansing, Mich., and W. P. Wood, Pittsfield Spark Coil Co., Dalton, Mass. The object of the organization is to defend the rights of its various members to manufacture, use and sell interchangeable unit spark coils, combining in order to reduce the burden of legal expense. The interchangeable unit coil as now generally used is covered by a number of patents that involving the basis of unit construction being claimed as basic by its owners. It is this point in particular that American coil manufacturers dispute, their claim being that such patents only cover specific details and are not, in any sense, basic. Those present at the meeting and the companies they represent follow: A. H. Stroud, Chicago Coil Co., Chicago; C. P. L.



DELAHAYE TRUCK WITH ITS TILTING BODY



Noxon, Syracuse, N. Y.; C. P. Byrne, Kokomo Electric Co., Kokomo, Ind.; C. F. Splitdorf, Walton avenue, New York; F. A. Wood, National Coil Co., Lansing, Mich.; W. P. Wood, Pittsfield Spark Coil Co., Dalton, Mass.; George Parker, American Coil Co., Foxboro, Mass.; H. G. Mears, New York Coil Co., 338 Pearl street, New York, and E. J. Huber, Duplex Coil Co.

#### TO PREVENT PRICE CUTTING

Akron, O., Jan. 11—As a result of the more or less recent formation of several organizations, the chief object in life of which has been the supplying of accessories at cut prices, and particularly tires, the Goodyear Tire and Rubber Co. is taking steps to protect its dealers against competition from this source. In a circular letter it calls attention to the "International Automobile League," Buffalo, N. Y.; "Coöperative Auto Association of America," New York, and the "Bureau of Automobile Auditors," also of New York. These organizations advertise that they are able to supply tires and other supplies to the consumer at dealers' prices, and to do this it is necessary that they should be able to obtain dealers trade discounts through certain dealers. In order to put a stop to this practice, the Goodyear company is requesting its dealers to inform it of the serial numbers of tires thus purchased that have come under their notice. By this means it will be possible to trace the original purchaser of the tire and thus determine the channel through which it reached the price-cutting association and trade prices will be immediately withdrawn.

#### REWARDS FOR POLICE

Buffalo, N. Y., Jan. 11—Members of the Automobile Club of Buffalo are so determined to check the theft of cars belonging to their members that the directors have authorized the payments of \$50 each to Patrolmen Keenan and Martin, who recently made arrests in connection with the theft of two cars.

## PACK THE BIG PALACE

### Record Attendance at Independent Show, 93,965 People Passing Through Gate in Week

New York, Jan. 11—A compilation of the attendance record for the Grand Central palace show, which closed last Thursday, results in the claim that a new record was established during the 7 days of 93,965 persons. The biggest day was Monday, when almost 20,000 people passed through the gates from 9 o'clock in the morning until 11 in the evening. Although it rained on "society day," the attendance was 30 per cent over the 1907 show.

At no previous show was there ever such a selling of foreign and improved cars and accessories, it is asserted. There was a total of 1,089 dealers registered, coming from all parts of the country, including San Francisco and towns in Texas and the south. There was one dealer present from Japan and four or five from England and France. In addition to these regular dealers, there were admitted through the main gate prior to 1 o'clock each day, in recognition of their trade connection, salesmen and others connected with the motor car trade. The number of carriage dealers who attended the show was a few over 200.

Before 5 o'clock on Friday almost all the exhibits were removed and the decorations all down and packed for shipment to Rochester where they will be used to decorate the Rochester show in March.

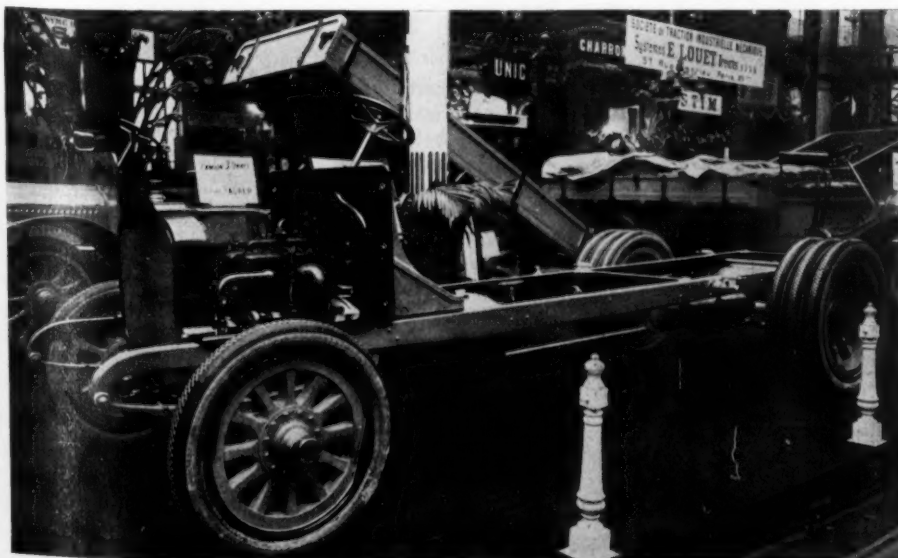
The annual luncheon of the A. M. C. M. A. at the Hotel Manhattan last Tuesday was well attended, among the speakers being H. O. Smith, chairman of the show committee, who said in part: "I cannot refrain from comparing this gathering with another held 4 years since at the Breslin hotel with a total attendance of four, I refer to the first meeting which had to do with the forming of the American Motor

Car Manufacturers' Association and yet, if we reflect, we will see that the growth of this association has been no more remarkable than that of the industry itself. Looking back but a few years, we find a few small makers operating in a limited way, struggling with an idea and a problem which the public at large unhesitatingly pronounced as impractical and incapable of satisfactory solution. While this industry has already taken a position of prominence among the first in the country, who would attempt to predict its limitations 5 or 10 years hence? The shows have unquestionably supplied their part in the great march of progress."

#### REVISED QUAKER STANDING

Philadelphia, Pa., Jan. 11—Protests which have been upheld by the contest committee of the Quaker City Motor Club have materially changed the order of finish in the new year's endurance run, and an appeal by the Premier which has been carried to the A. A. A. may still further change the standing, as the protestant seems to have a good case, although the contest committee decided against him. On Wednesday afternoon a special meeting of the contest committee was held to thresh out the protests. As a result of the testimony adduced there four class A cars were disqualified entirely—Tuttle's Stoddard-Dayton, No. 13; Carris' Franklin, No. 18, which had been originally placed No. 2 at the finish; Darnstaedt's Rambler, No. 19, and Ray MacNamara's Premier, No. 21—either for receiving outside assistance in climbing Giant's Despair, for getting up the mountain sans passengers, or both. The Premier people were represented by an attorney, John Handy Hall. The Premierites' testimony showed that while the car had run a short distance—probably 50 yards—without its passengers, the driver had done so with a clear understanding that such a proceeding was justifiable in the event that it was found impossible to secure traction otherwise; that, in response to a query the night before, Dr. J. R. Overpeck, a member of the committee, had declared that the unloading of passengers under such conditions on a slippery hill would not be punishable. On the ground that the Premier had gone passengerless farther than was necessary to secure traction, the committee voted to disqualify the car. As finally reckoned out, the final standing—barring the result of the Premier appeal—is as follows:

No.	Car	Total	No.	Car	Total
7	Matheson	11	13	Stoddard-Dayton	•
12	Oldsmobile	13	16	Franklin	Out
23	Oldsmobile	15	17	Winton	Out
24	Stearns	30	18	Franklin	•
6	Matheson	37	19	Rambler	•
15	Matheson	70	21	Premier	•
3	Cadillac	81	5	Peerless	50
10	Mitchell	127	4	Maxwell	239
2	Cadillac	135	1	Stoddard-Dayton	No cards
8	Stoddard-Dayton	140	2	Mitchell	Out
14	Studebaker	195	3	Oldsmobile	Out
4	Acme	269	6	Knox	Out
20	Maxwell	758	7	Rambler	Out
5	Elmore	Out	8	Bulck	Out
9	Mitchell	No cards			
11	Winton	Out			



COMMERCIAL RIG WITH THREE TIRES ON EACH REAR WHEEL

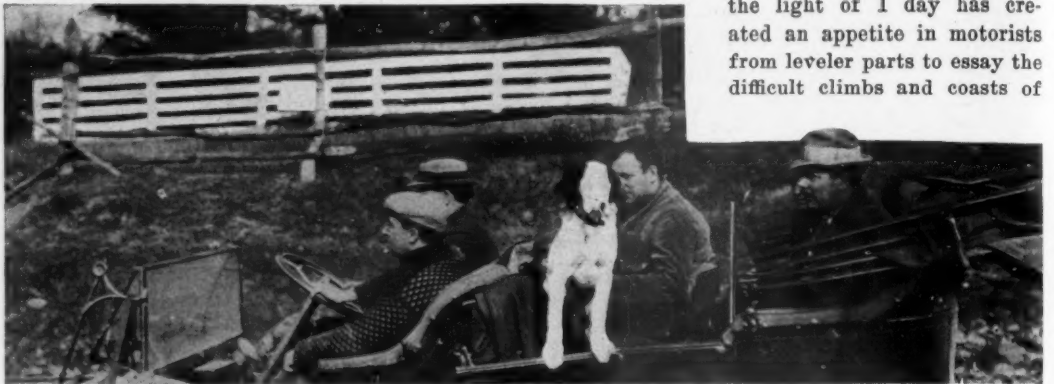
# HUNTING PARTIES INVADE THE ALLEGHENIES

**T**HERE are not many places in the United States where hunting from a motor car is so easy and interesting as in the Allegheny mountains. This mountainous portion of Pennsylvania does not abound with game, but there is enough there so that a lot of hunting will probably result in some finding. However, the mere hunting in that region is a delight, especially by motor car. In some of the districts the road is so far from the game country that a motor car can be used only as a means of coming and going between long digressions on foot.

The thoroughfare which runs from Pittsburgh to Philadelphia passes right through a sparsely-inhabited, semi-wild country where whatever game exists is in the woods close to the highway. Thus it is possible to drive a car over the Pittsburgh-Philadelphia turnpike and over the little mountain trails which lead off of it, and be at all times within a few feet of good places to sit and wait for squirrels or to chase an ambitious setter after illusionary pheasants. A sufficient number of rabbits run across the road in front of the car to warrant keeping a shotgun ready at all times for action.

## Surroundings Are Pleasant

The road itself is a hard one, but the surroundings are so pleasing that it has become more or less noted as a motoring thoroughfare, originally having been a trunk line of travel from the east to west which deteriorated after the stage coach days into a mere mountain trail, patronized only by the few farmers, the rural



GENERAL BRADDOCK'S GRAVE ON NATIONAL PIKE AND THE HUNTING PARTY IN A PACKARD

## By W. W. Bennett

mail delivery man and an occasional "foreigner" with goods to sell the unsuspecting mountaineers.

## Country Is Picturesque

The country is not so well finished as the mountain districts of New England. There are few rivers. The forest is merely a second growth and there is not much evidence of wealth or prosperity anywhere. Consequently, the virgin blush lies on the land a little more vividly than where roads have been ironed out and livery stables turned into garages. Eating is the chief pastime of the mountaineers and they play a very good game. The popular dishes are chicken and pork, although in the higher altitudes the latter has a great resemblance to the razor-back of the southern hills. In fact, there is a suspicion of the south in most of the personal habits of the Pennsylvania mountaineers.

Through this peculiar country there has been much motor car touring in the last 2 years. Probably the flight of the Glidden tourists across the Alleghenies for two successive seasons has stimulated travel in this direction by individuals. Also, the record-breaking stunts of some of the harder motorists who have made violent trips from Pittsburgh to Philadelphia by

the light of 1 day has created an appetite in motorists from level parts to essay the difficult climbs and coasts of

the Alleghenies in a big motor car. The brisk autumn weather put a stop to the ordinary family touring, but, with the opening of the game season, came a new lot

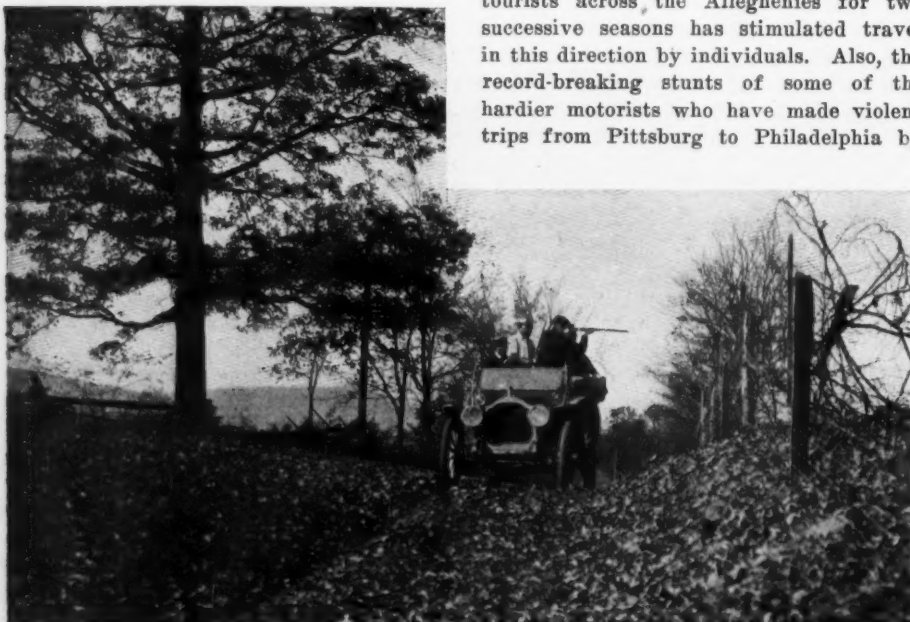


HIGHWAY A ROUGH SHELVE

of motorists bent not on continuous travel but on loitering through the hills and woods seeking pheasants, quail and squirrels particularly.

After having been bumped 20,000 times between Pittsburgh and Philadelphia—when I was the excess baggage on a record-breaking trip whereby one S. D. Waldon, at the wheel of a 1909 Packard Thirty, made the 303 miles between the two burgs in 14 hours—it was delightful to anticipate a trip through these same hills with the privilege of going slow over water breakers.

The more or less legitimate excuse of the trip was picture-hunting, and there being six of us, the paraphernalia consisted of one camera and five shotguns. We also had a setter, who was supposed to be the real thing in his line. Some day I would like to go hunting in a neighbor-



SQUIRRELS HAVE BEEN KNOWN TO BE SHOT FROM PASSING CARS



hood where there are as many pheasants as this dog thought there was in the Alleghenies. He also was a good retriever. Every time a rear tire exploded it took two men to hold the dog while the other four fixed the tire. There is a lot more fun going through these hills without any schedule than in even beating a schedule. I have done both, and I know.

On previous fast trips over this same road, the passengers often have looked at the wild hillsides with that same fleeting regret of a passenger in a limited train which does not stop for a satisfying second look upon a beautiful scene. When you are picture-hunting with a pheasant-chasing setter in the Alleghenies, while a Packard is always on the road to go at any speed you wish in any direction you wish, the percentage of wanderlust in your



CROSSING A TYPICAL WATER BREAK

the while merely by its own gravity, the last atom of gasoline having been consumed in painfully staggering to the crest of the ridge behind. We were a score of miles from any town large enough to carry gasoline as a necessity and at least 10 miles from a village which might have it as a luxury. There was a fair coast of 5 miles, but every thank-ye-ma'am brought the fear of being left helpless half-way down the mountain.

We wasted no accumulated power by unnecessary application of the brakes. We murdered no momentum because of water breakers. We simply careened down the mountain from one cross ridge to another, bumping ahead into an uncertainty which held more than one possible kind of disaster. Gradually the road seemed smoother and we rolled along more easily, then more slowly and then stopped. We were almost at the foot of the ridge. We pushed the car a short way over a water breaker and coasted another  $\frac{1}{2}$  mile to the extreme floor of the valley. We walked to a farm house a short distance ahead and contracted with the farmer's wife for a delayed supper, while the farmer, via the rural telephone, contracted for 10 gallons of gasoline.

#### Long Wait for Fuel

We ate supper in a hurry and then waited 2 hours for the gasoline to appear. The stage setting was magnificent, but the audience was impatient and the gasoline man evidently forgot his cue. With nothing else to do, we climbed into the silent car, where we wooed our blonde inamorata, Lady Nicotine, and sang songs that had been in our school books and some that had not.

When dawn actually arrived on schedule time over the edge of the ridge in the east, we were perched above a heavy mist which left only the mountain crests sticking out of its solid whiteness, like little planets in a nebulous universe. Even among these minor mountains there was something almost appalling in

diving full tilt into the thick fog, only to rise laboriously out of it and find ourselves again surrounded by nothing.

#### Rambling in Mountains

That was one night. For 3 other days we rambled about the mountains; struck off of the rough main road into rougher by-paths, which have misleading names like Peach Orchard road, and picked slow and almost impossible ways among such unusual places as Rocky Batter, which is the colloquial name for a mountain that fell to pieces and became an immense pile of broken stones. We turned southward from the beautiful autumn tints of the Allegheny roads into the still more beautiful and less rugged Maryland and struck westward again on the National pike.

We caught a faint echo of the real south, coming up along the softly vignetted edge of the Blue Ridge and we rode along the Potomac where it is a pretty creek in a dirty region, hardly seeming it can be the beautiful river it becomes further along its winding way to the coast. Finally, we got back to civilization in the land of the sullen coal mine, the omnipotent steel mill and the glaring coke oven which illumined the heavy evening sky. Consequently, that is all of this story, which is supposed to have been about the rough hills.



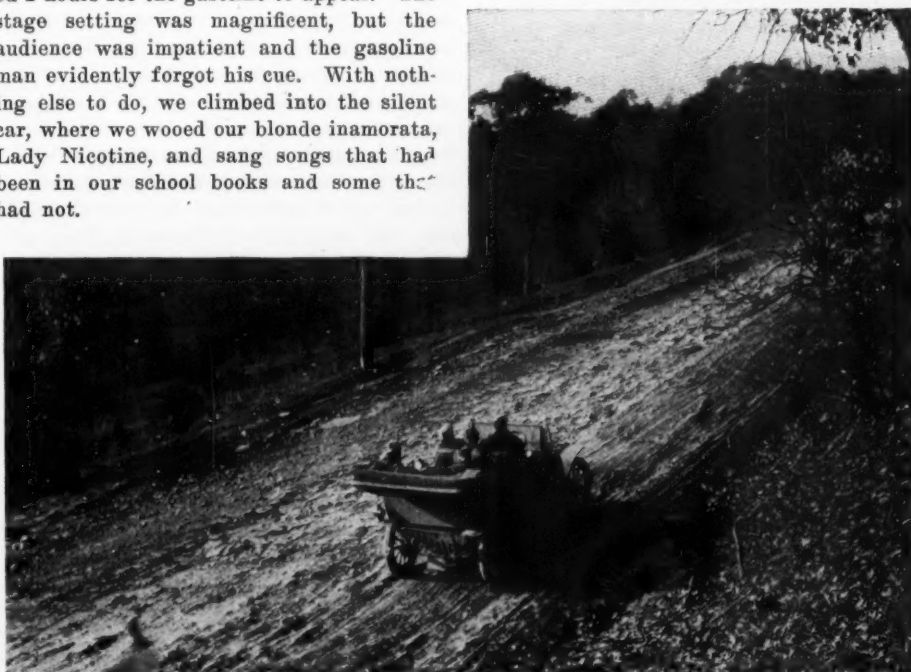
ALONG THE RIPPLING JUNIATA

make-up comes to the surface and it seems a waste of good gasoline and good tires to drive merely homeward.

We drove by night across two mountain ridges. Of course, the Alleghenies are not real mountains like the Rockies or the Andes or the Alps. Of course, there are no bona fide mountaineers in the Pennsylvania mountains. They are just poor farmers. Of course, the woods are not primeval forests and the precipices are not steep enough or high enough to be described in Baedeker or even in railway folders. However, a night journey has its own sensations which are akin to adventure.

#### Run Out of Gasoline

There was something at least unique in sliding down out of the clouds into a dark forest where the road straggled precariously on the edge of the mountain and dove into still blacker valleys—our car running



A STEADY CLIMB OF 5 TO 6 MILES UP THE MOUNTAIN RIDGES



# The Readers' Clearing House



## ON THE TIRE SITUATION

**A**KRON, O.—Editor Motor Age—I think information on tires at this time is not amiss, in view of the fact that the recent action in reducing cost on tires to the consumer, due largely to misrepresentation and partly to misunderstanding, is construed to mean that this reduction is in effect sufficiently drastic to affect the value and the quality of the goods purchased under the new prices. The fact of the matter is that quite the reverse is the case, that is, so far as any reputable manufacturers are concerned, as while to the unthinking man the large reduction in the list price would indicate a reduction in the quality of the goods and a reduction in the profit to the manufacturer that would compel such reduction in quality, the reverse is quite the fact. To the thinking man, the one who has actually studied out just what has occurred would find that the reduction is not a reduction that reaches into the profits of the tire manufacturer but is only a reduction of a fictitious list price that was used by the dealers of the country during the past year to bring about a condition of price-cutting such as has hardly ever been known in connection with any produce for years. The old list prices provided 40 per cent to the dealer. It was abnormal; altogether too much to expect the dealer to retain. He started giving it away. Finally, the cutting became so drastic that the dealers of the country were doing business on 5 to 10 per cent profit on tires, giving away 30 to 35 per cent of the profit the list prices provided. A condition of this kind could not be allowed to prevail without a harm to the industry as a whole, not only to the tire maker but to the car builder. It gave the public the impression that if the list prices of tires was so fictitious that it would stand for such large cuts and still give the dealer a profit, then in a corresponding ratio each and every article in connection with the motor car industry was mentally placed on the same plane. The car builder was being accused of charging too much for his cars, etc.

The dealers having shown absolutely no spirit of willingness to retain for themselves the profit provided, all that the tire makers have done is to reduce the fictitious list to a point that the dealers had heretofore been cutting it, in an endeavor to bring about a normal condition in the business on tires as conducted by the dealers and really through this move increase the value of the tire sales in the hands of the dealers and make his business more profitable than it has been in the past and which we confess at present many dealers do not as yet understand or realize. During the

**EDITOR'S NOTE**—In this department Motor Age answers free of charge questions regarding motor problems and invites a discussion of pertinent subjects. Correspondence is solicited from subscribers and others.

past year the business that logically belonged to the dealers of the country was drifting into the hands of the price-cutters. It was going to the notorious large concerns operated in the leading cities of the country solely and entirely on cut price basis. With the margin of profit provided they could circularize the entire country and draw to them from nearby cities the business that should have remained in the city and gone to the local garages. The present arrangement on list prices and profit to the dealer prevents this. It is certain to result in the business of a city remaining in that city and going to the local dealer where it belongs. The competition from the large nearby cities can no longer be sustained on the present margin of profit as it would be unprofitable to circularize, pay transportation charges and cut the present prices.

This whole move is a protective one to the dealers of the country and should not be allowed to be misunderstood or misrepresented so long as we have publications to deal with the subject from a fair standpoint and with the absolute and proper information before them which they can rely upon. Any concern that attempts to continue the system of large profits to the dealer is an enemy to the dealers' business of this country as a whole. The dealer short-sighted enough to believe that a large margin of profit on tires provided for them indicates a friendly interest in their welfare by any tire maker is badly astray in his judgment. Such tires as are offered to the dealer at larger margins of profit than those that prevail on the leading makes is merely an incentive for said dealer to continue the price-cutting methods of the past and to still further assist in the demoralization of the trade on accessories and of reflections of doubtful character on the car builders themselves. It will be noted in the foregoing that the reduction therefore in price is simply a drastic cut in the list down to a point where the dealer is still getting a larger margin of profit than he made last year owing to cut prices, and doesn't affect the price which the tire manufacturer received, in material sense. Any advance in cost of raw materials which is a not unexpected thing would simply mean a corresponding advance in price, if made thus necessary, but would not affect the principle of this move to give stability to the sale of tires, as in making any advance the proportion in prices and profits on pneumatic tires and tubes would remain.

The average reduction on the leading makes of tires so far as the actual returns to the manufacturers of the tires is concerned is about 15 per cent. At this time this is offset by reduction in cost of raw material. It is, therefore, manifestly absurd to claim that on the present basis of prices, the quality of a tire turned out by any honest manufacturer should in any way be affected by these new prices and in fact it will not be, it need not be, and tire manufacturers interested in their future would not dare put out a less quality product when there is absolutely no necessity for it based on the change of price systems put in force this year.

For further information, let us take a glance abroad. Early in 1908 a prominent tire company startled the European market by making a drastic cut in the price of its product to the customer and a marked reduction in the profit on their tires to the dealer. All other companies rapidly followed suit. In a month or so after of the same year the same company made another reduction. In July of this same year the same company made a third reduction until as a matter of fact tires abroad are sold with a less degree of profit in them to the dealer than they are in this country. By comparison with the dealers abroad, the dealers in this country are better treated with a somewhat larger possible profit if they maintain their prices on the tire products.—H. E. Raymond.

## CASE OF ENGINE TROUBLE

**Cleveland, O.**—Editor Motor Age—I have a four-cylinder 40-horsepower touring car, side chain drive, automatic intake valves and mechanical exhaust, and capable of doing 60 miles an hour. It is hard to conceive of a more perfect running engine at a speed of from 15 to 30 miles per hour, which means a throttle open from one-quarter to one-half. As soon as I advance the throttle two-thirds to wide open, the engine knocks badly which seems to diminish as the car gains momentum but not to cease entirely. The fact that the engine runs so smoothly with the throttle open to one-half would seem to exclude the ordinary explanations of pre-ignition from carbon, or carburetor adjustment, poor water circulation or overheating of the engine, and I have come to the following conclusion and wish Motor Age would advise me whether I am correct in the supposition or not and what other cause would create this knock on wide open throttle, to-wit: The engine is very high compression and the isothermal pressure at high engine speed with wide open throttle and increased heat would be very great with no lag in an automatic intake valve closing, which would increase the com-



pression in increasing ratio as the throttle and speed advanced, resulting in pre-ignition due to the very high compression isothermally created. How is this corrected? What is the difference at present between European and American horsepower rating?—Reader.

Motor Age does not concur with your theory and would rather incline to the belief that there is an interconnection somewhere between the spark and throttle lever, which, when the throttle opens over half of the quadrant, crowds the spark lever forward as well. Motor Age does not know of any condition that would cause the gas to make the knock. There is no difference between European and American horsepower rating, although it is the foreign custom to rate an engine lower than it really is because of the tax which is imposed on a horsepower basis.

#### LIGHT ON LIGHT SUBJECTS

Plainfield, N. J.—Editor Motor Age—I have read with interest the very complete article on lighting equipment in Motor Age. I beg to say that the remarks concerning the use of waterjackets on acetylene generators are incomplete and somewhat misleading. There are, as Motor Age says, a number of generators on the market having waterjackets around the carbide chamber with a view of equalizing the temperature, but as a matter of fact, their cooling effect in the absence of any circulating or radiating system is practically nil, as a little consideration will show. Such waterjackets are about as much use on gas generators as would be a water-jacket on an engine cylinder plugged up tight with no radiator or circulating pump. In a representative water-cooled generator of a type that formerly had considerable sale, the carbide basket has a capacity for about 3 pounds of carbide. The water-jacket surrounding the carbide chamber has a capacity for just 53 cubic inches of water, weighing 1.9 pounds. As there is no circulating system, this waterjacket can be effective only to the extent of the specific heat capacity of the water it contains. This generator is ordinarily used with  $\frac{3}{4}$ -foot burners which under average conditions will call for a consumption of about  $\frac{1}{4}$  pound of carbide per hour. The decomposition of 1 pound of commercial carbide is accompanied by the evolution of about 700 B. T. U. so that in the generator in question the jacket must get rid of about 560 B. T. U. per hour, or 9.3 unites per minute. Allowing a temperature rise of 70 degrees Fahrenheit, the 1.9 pounds of water will absorb but 134.4 heat units, so that in  $14\frac{1}{2}$  minutes the capacity of the waterjacket to cool the gas is exhausted. After that it is totally ineffective. The most important thing about a waterjacket is it helps sell the generators. In practice it is rarely used as a waterjacket, as the customer rarely puts any water into it, and it then becomes a "hot air" jacket. Although when filled with water the jacket

is harmless, when filled with air it is a great disadvantage as it retains practically all the heat with the result that the acetylene is decomposed into tar vapors which give the sickly red flame frequently noticed, choke up the burners with tar, and give the lime dust the characteristic yellowish-brown color. In generators having provision for the constant separation of the lime dust from the unused carbide, there is no overheating and no necessity for waterjackets even if such jackets were effective.—S. W. Rushmore.

#### DISCOVERS THE CAUSE

Clinton, Ia.—Editor Motor Age—My experiences with motor heating may be of interest to Motor Age readers. I have a 24-horsepower Studebaker car, and have had more or less trouble with the motor heating and water boiling over after a short run. Having occasion to take the radiator off and before replacing it I discovered that the piece of hose that connects it to the pump was almost completely closed up. The party that made the connection of hose to pipe that connects to pump, in forcing the hose over the end of the pipe evidently loosened the lining of the hose, which formed in a lump or ball in front of the opening in the pipe—which almost entirely closed up opening and prevented circulation of water, causing overheating. I replaced the piece of hose with a new piece, being careful to leave the opening in it full size, and have had no trouble since.—J. P. Calnan.

#### TROUBLED BY JACK FROST

Huntington, Ind.—Editor Motor Age—Last season I had considerable trouble with the water freezing in my Rapid motor truck. What solution has Motor Age for such difficulties?—B. J. Bartlett.

Anti-freezing solutions were discussed in these columns, issue October 15, page 26, also October 29, page 29, and in the November 19 issue, pages 28 and 29, the subject, under the head of "Cooling in Winter a Serious Problem," was gone into at some length.

#### HIGH SPEED AND TIRES

Grinnell, Ia.—Editor Motor Age—In a recent discussion I asserted that a racer could not attain very high speed on our common roads if equipped with solid rubber tires, as the small bumps would offer so much resistance; while, on the other hand, pneumatics would absorb the bumps, so to speak, and there would be less opposing force to the machine. My friend holds that the "rolling friction" of a pneumatic tire is much greater than any resistance offered to the solid tire, and the reason that pneumatic tires are more efficient, as far as speed is concerned, is that the drive wheels are on the ground

more of the time on account of less "bounding" of the machine. Who is right?—W. Stanley Wells.

Motor Age would side with your friend, although you advance an almost impossible condition. At a high car speed with solid rubber tires the vibration would be so excessive that it would be impossible to hold the car together or to stay in it.

#### DISPUTE WOODSTOCK'S CLAIMS

St. Paul, Minn.—Editor Motor Age—Flandreau, S. D., which is 18 miles from this city, has sixty-one motor car owners. It is a town of 1,500 people. I think this makes a record ahead of that of Woodstock, Ill., mentioned in Motor Age December 24, 1908.—William M. Lowe.

Pratt, Kan.—Editor Motor Age—I believe Pratt has the record ahead of Woodstock, Ill., Pratt has a population of 2,532 and has thirty-one motor cars owned by private parties. There are three one-cylinder, twenty-two two-cylinder and six four-cylinder cars. However, the cheap four-cylinder car bids fair to predominate in the near future. Two years ago Pratt had two cars.—E. W. Jones.

#### MAGNETOS DEFINED

Grinnell, Ia.—Editor Motor Age—Through the Readers' Clearing House will Motor Age explain the difference between a high-tension and low-tension magneto, and what each is accustomed to have in the way of wiring and coil?—Subscriber.

A high-tension magneto gives the same current that is needed at the spark plug, and this type of magneto geared to the motor is equipped with a timer and distributor, the only wiring necessary being four wires from the distributor to the spark plugs, although a fifth wire may be used from the distributor to a switch and thence to ground to be used for stopping the motor by deflecting the current from the plugs to the ground. The low-tension magneto is usually an alternating current generator and the current is delivered to the primary of a non-vibrating coil, where it induces a high-tension current in the secondary winding of the coil. This induced current is accomplished by the making and breaking of the primary circuit by a device on the magneto. From the secondary of the coil the current passes to the distributor and thence to the plugs.

#### MAKER OF ST. LOUIS CARS

Lakota, N. D.—Editor Motor Age—Through the Readers' Clearing House will Motor Age inform me where the St. Louis motor car is or was built.—Lakota.

The St. Louis motor car was manufactured by the St. Louis Motor Carriage Co., Peoria, Ill., which concern went out of existence several months ago.



## Fire-Fighting Motor Rigs



FIG. 5—PRACTICE TOWER AT LEE GREEN

**F**IRE and the motor car have always been closely connected. In former days the sight of a motor car in flames has collected many a jeering crowd of people, who, by their attempted witticisms and caustic remarks, have ridiculed the efforts of our early motor car manufacturers. The scoffing is now turned to admiration, for the work of the motor is not to cause fires but to assist in quelling them, and many a cheer is given as the motor fire vehicle comes dashing up to the scene of action; if from a neighboring station, generally the first to arrive, and if from a distance then often to hand as quickly as some of the horsed vehicles which have not had so far to go. English brigades have taken kindly to the new order of things, and people who have not taken the trouble to look into the matter are surprised to learn of the headway that is being made. The London correspondent of *Motor Age* has been at some pains to gather information on this subject, and the result of his investigations shows that the motor fire vehicle has come to stay just as much as the motor car is a permanency in the other channels in which its usefulness has been directed.

The number of motors in use by the London fire brigade is sixteen, and delivery of further vehicles is being taken as fast as the orders can be completed. Two stations, namely, those at Tooting and Lee Green, are equipped entirely with motor fire apparatus, horses being dispensed with altogether, and soon two other stations will be similarly converted. At the time of the correspondent's visit, they were waiting for delivery of the vehicles. Lee Green was the first station to be given up entirely to the motor, and here is installed the 10-horsepower Wolseley car with which A. R. Dyer, the assistant divisional officer of the London fire brigade,

by Merryweather. The escape has a 60-gallon tank and 180 feet of tubing, and can travel practically any distance within reason, though the farthest it had been was to a fire at the Greenwich and Deptford Homes, Sidecup, a distance of about 4¼ miles. The steamer can carry enough water to run about 6 miles and work at a fire for 2 hours without refilling, and take sufficient oil-fuel to run the same distance and work at high pressure for the same time. Superintendent Deakin was good enough to give a surprise call at *Motor Age's* request, and although a turn-out with horses is rarely made under ½ minute, the gasoline escape was timed to turn out in 16 seconds and the steamer in 25. With regard to the steamer it is interesting to note that the one engine fulfills the duties of both driving and pumping, and that the pulling over of a lever enables the engine to be pumping water about 2 minutes after it has driven the vehicles and men on to the scene. It will be observed in Fig. 1 that the steamer, which is on the left of the reproduction, has nonskid covers fitted over solid tires. Since this arrangement was adopted, no trouble has been experienced with skidding, whereas, before, that was one of the greatest drawbacks to the steamer's usefulness. In cases of side-slip, it does not do to apply the brakes, as with the short wheelbase and weight, the vehicle would skid around. The drivers, therefore, keep the steering as straight as possible and depend on the reversing gear. But, happily, as mentioned, those troubles are now practically overcome. In the right of the illustration is the gasoline escape, and, standing beside it is Superintendent Deakin, who



FIG. 3—GASOLINE HOOK AND LADDER AND STEAM ENGINE



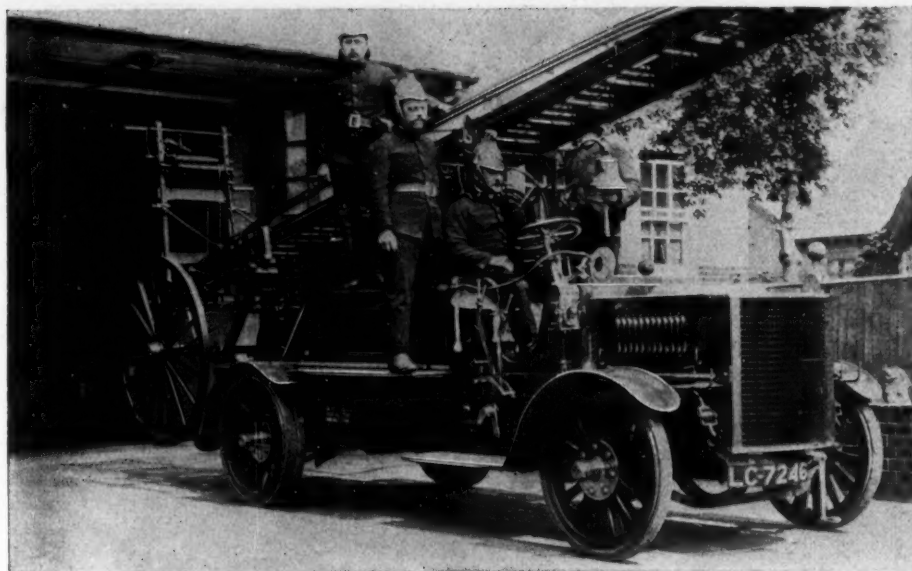


FIG. 2—MERRYWEATHER'S GASOLINE HOOK AND LADDER

has control of eighteen stations, including the river-float "Beta." Fig. 2 shows the gasoline escape alone, Fig. 3 shows the two cars mentioned at speed, and Fig. 4 shows them together with a gasoline-driven escape car with the escape removed. The latter was placed at Motor Age's disposal to make the tour of the London stations. At the Lee Green station there is also a tower for keeping the men in practice, of which the photograph, Fig. 5, is a demonstration.

#### Motor Station at Tooting

The other fully equipped motor station, Tooting, contains a Merryweather steamer and two motor escapes built by Commercial Cars, Ltd., of Luton, Beds. The latter are styled first-aid machines, and are intended to be quickly on the scene to grapple with the fire in its early stages if possible, or, if the fire amounts only to the conflagration of a room, or a small shop, etc., the machine is generally sufficient to complete the work of suppression itself. Fig. 6 shows one of the first aid cars, Fig. 7 the same at speed, Fig. 8 the steamer, and Fig. 9 the three Tooting cars, with Superintendent Todd, who is in control of fifteen stations, including the Battersea float, where also there is a motor escape at the land station, standing between the left-hand escape and the

A feature of the mechanism is the gear-changing. This is so arranged that the speed lever can be moved over into a different notch without the speed actually changing. Then a press of the clutch will allow the driver to change at the most favorable moment. Thus, for instance, in ascending a hill, before it is necessary to change speed the driver can coolly move his lever over from the fourth to the third speed, and wait until the beat of his engine gives him an indication that he should change. He then partially withdraws the clutch and he will hear the gear move.

The progress made in the use of motor fire appliances in the great provincial

cities is steady, although here and there the anti-motor feeling still keeps the forward movement from making headway. For instance, although motor fire engines and appliances have been in use for some years now, not only in England and Wales, but on the continent, the chief officer of the fire department of the corporation of Dublin has not adopted motors, although he has been studying the

subject for several years past and he is not yet disposed to recommend anything that has been produced for the purpose. By this, he is supposed to mean that up to the present his ideal has not been reached and in the meantime, like Nero, he will fiddle—and let Dublin burn.

#### Aberdeen in Advance

In pleasing contrast to this, is the enthusiasm shown by M. W. Inster, the firemaster of Aberdeen, Scotland. He claims that the Granite City was the first in Scotland to adopt motor traction for fire brigade work. In so doing, the firemaster thought it would be better for the city and give the inhabitants the advantage of an up-to-date system. The corporation of Aberdeen in 1904 appointed a deputation to visit the chief cities in England, where motor traction was installed in the fire brigades and also to go to the leading manufacturers of the tree. The first-aid cars are fitted with compressed air tanks standing at 80 pounds and which, at present work at about 100 pounds. Strictly this should be 120 pounds and it will be so when the adapter for a hand-pump is fitted. The car can run down to about 7 miles per hour on top gear, and is capable of a speed of about 30 miles per hour, but rarely, if ever, can these vehicles be let "all out." Consequently the speed is taken as about 20 miles per hour.

#### MOTOR CAR TIRE APPARATUS IN THE LONDON SERVICE

Vehicle	Speed	In service	Where stationed
Merryweather steamer.....	28	3 years	Whitefriars
Merryweather steamer.....	28	2 years	Wapping
Merryweather steamer.....	28	2 years	Euston
Merryweather steamer.....	28	1 year 7 months	Lee Green
Merryweather steamer.....	28	1 year 5 months	Cannon Street
Merryweather steamer.....	28	5 months	Tooting
Merryweather gasoline escape.....	25	2 years	Lee Green
Morris gasoline escape.....	25	1 year 9 months	Battersea Float
Commercial cars, gasoline escape.....	20	5 months	Tooting
Commercial cars, gasoline escape.....	20	3 months	Tooting
Locomobile, general uses.....	25	6 years 10 months	Headquarters, South
Wolseley gasoline chassis.....	25	4 years 10 months	Lee Green
Albion gasoline car, fires and general....	22	2 years 11 months	Headquarters
Alldays gasoline car, fires and general....	30	2 years 6 months	Kennington
Merryweather gasoline hose tender.....	25	1 year 8 months	Euston
Merryweather gasoline hose tender.....	25	2 months	Headquarters



FIG. 1—MERRYWEATHER'S GASOLINE APPARATUS AND STEAMER



FIG. 4—THREE FIRE-FIGHTING RIGS



FIG. 6—FIRST AID APPARATUS AT TOOTING

appliances. This they did, and on their return, they reported favorably on the disposal of horses, specifications for a machine which would successfully negotiate the various gradients to be met with in Aberdeen, were drawn up and estimates were received. The successful tenderers were Messrs. Merryweather & Son, London, and after 3 years' work, nothing but satisfaction has been expressed at the behavior of the machine. On the comparative side, Mr. Inkster says there is no comparison with the horse vehicle as regards either utility or economy. Everything is in favor of motors, to the disadvantage of horses every time.

#### Contented on the Clyde

So long as the Glasgow Scot. corporation acts up to its motto, "Let Glasgow Flourish," the city on the Clyde will continue to go ahead. In the matter of fire appliances, as behooves so important a place, with so much property of valuable nature at stake, Glasgow went into the question of motor fire appliances 4½ years ago, when a Wolseley-Siddeley 24-horsepower hose cart was purchased. In order to prevent collapse from side

chains, the wheels, of artillery pattern, were reinforced with wire spokes, tied from the inner side of the felloe to a rim turned on the outside of the hub. The machine being somewhat lighter than an engine, a higher rate of speed was obtained. When the Glasgow corporation received it from the makers, a few alterations were found necessary, not from any fault of the manufacturers, but because the Glasgow fire turnouts generally carry from ten to twelve men, with a lot of heavy fire extinguishing apparatus, but this added weight has not interfered with the efficiency of the vehicle, which has in the past and is at present giving good results.

Germany has supplied Glasgow with a gasoline-electric front-wheel-driven fire escape weighing 6½ tons. This has been in use 2 years and has been of great benefit in getting to top floor fires.

Then there are three gasoline fire engines, with fire pumps attached worked by the propelling engines, and capable of throwing 450 gallons per minute. The pumps are 50 horsepower and were built by Merryweather. They have been in

constant use in the city and suburbs. One recently ran to a distillery fire, 17 miles from Glasgow, carrying all appliances and eleven men, then worked over 5 hours pumping hard all that time. Each pump weighs 3½ tons and they travel, all on, from 15 to 20 miles an hour.

When asked for a comparison between the cost of horsed engines and motor engines, the chief engineer of the Glasgow fire brigade remarked that it would not be fair to the horses to do so. The engines stand 23 out of the 24 hours per day with little or nothing for keep; whereas the horses require feeding, stabling, exercising and grooming, independent of actual fire duties. As regards speed in reaching fires, the motors get to the fire in half the time of the horses and this early appearance on the scene of operations has undoubtedly been the means of preventing what would have been extensive conflagrations if horsed engines had been relied upon. Thus a few minutes saved at the start has often resulted in property being saved many times more valuable than the cost of the motors and this has brought their valuable properties home to the notice of the citizens and has convinced them of the superiority.

Glasgow has had a few minor troubles with her motors, but expected them like other people. However, there is not the slightest thought of giving them up.

#### Steel City Satisfied

Sheffield, the Cutlery City, is geographically bad for horse traction, inasmuch as it is situated in a circular hollow and the streets are almost all more or less sloping. In some parts, the incline is very steep. To a pair of horses, traced up to a heavy fire engine, it is a difficult matter to climb at any speed up such streets and meanwhile things are going to blazes somewhere. Now, however, a different complexion has been put on affairs, and the "mon who cooms fra' Sheffield" can boast of a motor fire service which is developing into one of the best in the country. As an example, the fire

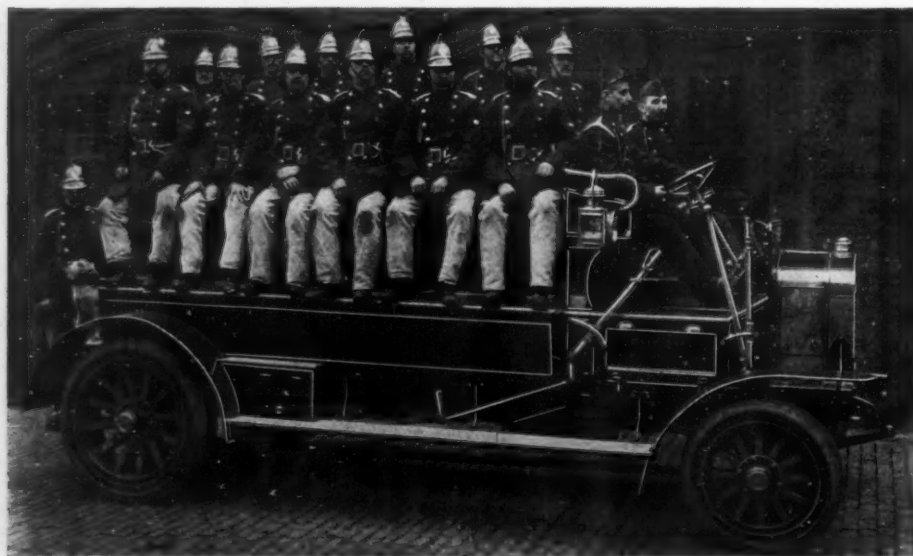


FIG. 10—SIDDELEY 3½-TON LORRY USED AS HOSE CART



department has a gasoline motor escape of 40-45 horsepower, four cylinder 5-1-inch bore, 5-5-inch stroke, fitted with two ignitions, accumulators and Nilme-teor magneto. The drive is by means of a live axle and worm. There is an 11-foot wheelbase and a 5-foot tread. Solid rubber 4-inch tires are fitted to the front wheels and 3-inch twin rubbers to the back. Two brakes are fitted, either the side or foot brake being sufficiently powerful to stop the machine, even when fully manned, on the steepest hill. There are three speeds, 7, 14 and 21 miles an hour, and a reverse, while the engine travels at 1,100 revolutions per minute. Large head lamps are provided, and by using dissolved acetylene gas, and having sparking plugs fixed inside the lamps, it is possible to turn on the light at once from the driver's seat. This is a novel idea and a great advance over the ordinary methods of lighting. It also renders the extinction of the light a quick operation. Twenty gallons of gasoline can be carried and the consumption is about 1 gallon per 9 miles. The hose box extends from the driver's seat to the rear of the machine, and is 7 feet 3 inches long, 3 feet 5 inches broad, and 1 foot 6 inches deep, and is accessible from either side and also at the rear. The front seat has ample room for the driver and another, and a powerful foot gong is fitted. A very light but strong telescopic ladder is carried on two ornamental brackets in the rear of the driver, whose view is not obstructed in any way. The ladder is 19 feet long when closed and extends to a length of 36 feet. This machine has attended every fire in 1907 and this year since January 1, has been at ninety-three fires, and the motor has always been first. The Sheffield corporation has also an Argyll fire tender.

#### Birmingham's Race

That such an important city as Birmingham should only have two motors is surprising, but it is more surprising still that only one is available for fire extinguishing purposes. The other, a 12-14-



FIG. 9—TOOTING'S THREE CARS

horsepower, 2-cylinder Heron-Aster, is used by the chief officer for visiting the stations, and will carry six persons. The motor machine for fire use is a 35-horsepower, 4-cylinder Wolseley-Siddeley. It has a body very similar to the horse-drawn fire tender, can carry ten to fourteen men, carries two 5-gallon fire extinguishers, 600 yards of hose, standpipes, hand-pumps, water-lights, ambulance material and the usual extinguishing appliances. In order to insure it being properly worked when in charge of the brigade, two of the men were at the Siddeley works while the car was under construction, receiving driving instruction and four other men have been instructed since. This machine has been in use about a year, and so far has given every satisfaction in speed, control and running powers.

A motor fire tender is in use at West Bromwich, near Birmingham, and since its installation 16 months ago it has given entire satisfaction. It is essentially a first-aid machine, and when turned out for a fire carries 650 yards of hose, 48 feet of ladder, sufficient appliances to get four jets at work from the street mains, hand-

pumps, two chemical extinguishers, smoke helmet, jumping sheet, life line and twelve men. It is a Thornycroft 24-horsepower chassis, and at top speed will travel 20 to 30 miles an hour.

#### Gasoline Types at Liverpool

The seaport of Liverpool is far in advance of most English cities, and its fire department has an extensive knowledge of motor fire engines, having had them for five years. The superintendent in comparing the cost makes out that the motor engines cost in maintenance and having the cars ready to turn out in 1 minute about 50 cents per week, the horse-drawn engines costing \$20 per week. The Merryweather motor fire kings, each 500 gallons capacity, are the make used, and their speed on level ground is up to 30 miles an hour. They are fitted with solid tires, and oil fuel is used with Kermodes burner. The water tanks hold 75 gallons, and the oil tanks 75 gallons. The consumption of oil per hour is 15 gallons. The weight of the forward axle is 3,150 pounds, the rear axle weight being 3,175 pounds, while the weight unloaded is 7,625 pounds.



FIG. 7—HOOK AND LADDER AT SPEED

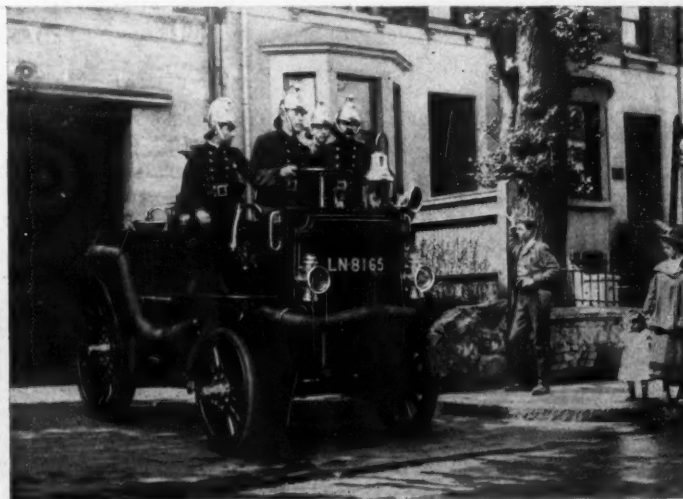


FIG. 8—STREAMER AT TOOTING



TYPE OF MOUNTAIN WAGON IN NORTH CAROLINA

OLD MANSION HOUSE IN WINSTON-SALEM, N. C.

**Holsman Agents Banqueted**—The Holsman agents in attendance at the palace show were entertained at a dinner at the Hotel Knickerbocker January 3 by the Holsman company. Plans and policies for 1909 were outlined, and the new 26-horsepower four-cylinder motor was discussed.

**Baltimore Wants a Show**—The Automobile Club of Maryland is making every effort to hold a show under its auspices in Baltimore some time during the latter part of February. D. C. Walker has been appointed chairman of the committee to work up the affair. Lack of suitable quarters is the only thing that makes the show uncertain.

**Show For Rochester**—The executive committee of the Rochester, N. Y., Automobile Dealers' Association has decided that the second motor car show to be held there will open in Convention hall the second week in March. Charles J. Moran will manage the exhibition. The show this season will not be connected with the Automobile Club of Rochester.

**Many Hoosier Bills**—Practically every solon who has arrived for the biennial session of the Indiana legislature seems to have a bill of some sort of interest to motor car owners and drivers. Their fate at the hands of the legislature is much in doubt, but the intent of the measures is interesting. At the instance of the Indiana Railroad Commission a bill is to be introduced providing that motor car drivers must stop their cars at all railroad crossings and watch carefully for approaching trains. State Geologist W. S. Blatchley has a bill providing that convicts shall be employed in making material for road building and repairing, as they are employed in a similar manner in some other states. Half a dozen legislators are pledged to introduce bills to repeal the 3-mile road law. This provides that a road not to exceed 3 miles in length shall be built on the petition of fifty property owners. The provision is made that the proposed road must connect two im-

proved highways. A bill is also to be introduced for a state highway commission which will control state road building. It will provide that the state, county, township and property owners shall divide the expense, the roads to be built under state jurisdiction.

**Minneapolis Show Plans**—The Minneapolis Automobile Show Association, recently incorporated, is busy receiving applications for space in the armory for the show to be given the week of March 13. The state armory, which was formally opened a few days ago, is an immense building, and, deducting the space used in aisles and in decorations and entertainment, there will be 40,000 square feet of space for show purposes.

**Pope Mfg. Co. Dissolved**—Vice Chancellor Howell, of Newark, N. J., has signed a decree dissolving the Pope Mfg. Co. In a petition for a decree of dissolution filed by Lindabury, Depue & Faulks, counsel for the receivers of the Pope company, it was stated that all claims of the creditors have been paid and that the assets of the company have been turned over to a reorganization committee pursuant to a court order, so that there is no reason for keeping up the old concern's existence. The new company is now in control of the situation.

**Another Tariff Angle**—The West Boylston Mfg. Co., of Worcester, Mass., has asked the ways and means committee to fix the duty on motor car tire linings at 45 per cent. It is pointed out that under section 320 of the Dingley tariff lining for bicycle tires was made subject to a duty of 45 per cent ad valorem. At the time the Dingley law was adopted fabric manufactured from cotton for use on motor car tires had not been made, as of course motor car tires had not been made then. Within recent years the manufacture of motor car tires has come to be a very large one, and necessarily the manufacture of fabric to be used in such tires, similar to fabric called "linings" used in bicycle

tires, has become a very considerable industry. At the present time, so the West Boylston Mfg. Co. is informed, fabric for motor car tires is admitted as cotton duck at an ad valorem duty of 35 per cent under section 321 of the tariff law. It is claimed this is not a sufficiently protective tariff.

**C. F. Kimball Dead**—After a lingering illness, C. Fred Kimball, president of the C. P. Kimball Carriage Mfg. Co., of Chicago, died last Thursday. The body was taken east for burial. Mr. Kimball was at the head of a concern which long has occupied a prominent position in the manufacture of motor car bodies and was stricken last summer while on a business trip in Europe.

**Money for Maryland Roads**—The Maryland Geological Survey during the present year will spend \$250,000 on the highways of the state, providing the various counties appropriate from their own funds a similar amount, as provided for under the state aid act of 1906. The most important work now under the supervision of the survey is the Washington and Baltimore boulevard. On this \$50,000 will be expended during the year if that amount is needed to complete the construction of the highway. The boulevard is now a little more than two-thirds complete. More than half of the roadway is finished and in commission, while much work has been done on the remainder of it.

**Praise for Pierce and Thomas**—Mayor Adam, of Buffalo, in his recent annual message referred in an emphatic manner to the touring victories of the Pierce Great Arrow and the triumph of the Thomas car in its trip around the world. He said in part: "In these victories American supremacy and superiority were established. Buffalo is proud of such industries as these two great factories and rejoices in their renown." Mayor Adam also referred to the subject of good roads as follows: "An association has been formed of public spirited citizens and prac-



tical work is being done to obtain a boulevard between Buffalo and Niagara Falls which will be a tremendous benefit to this city and a matter of pride to us as well as of praise from the thousands who annually visit the Falls from our city."

**Eager to Get Glidden**—Colonel F. M. Joyce, president of the Minnesota State Automobile Association, recently wired Chairman Hower of the A. A. A. contest committee regarding the chances of the Glidden tour going to Minneapolis this summer. The answer read: "Impossible to say; very uncertain at present, but route will surely be west." This answer means much, as Chairman Hower has said positively that if the tour is in the west this summer it will include Minneapolis and possibly Duluth. Colonel Joyce will go to Milwaukee shortly to confer with the Milwaukee club officials and to cooperate with them in making arrangements for the handling of the "Glidden army."

**After Artificial Hill**—Again the question of building a scientifically-constructed hill with absolutely correct grade is engaging the attention of the members of the Minneapolis club. The idea was broached last summer and a subscription list was at once started among club members, and now again the subject is up for consideration. It is planned to build the hill on the club's property at Bloomington, 18 miles from Minneapolis, along the Minnesota river bottoms. If necessary land will be leased adjoining that of the club and a hill  $\frac{1}{2}$  mile in length can be built. It will vary from 8 to 24 per cent grade and there will be a sharp hairpin turn which will take the cars in the opposite direction.

**Bay State Election**—The annual meeting and election of officers of the Bay State A. A. in Boston last week resulted in Lewis R. Speare, vice-president of the A. A. A. being chosen to succeed Eliot C. Lee. Harlan W. Whipple was reelected vice-president. J. S. Hathaway was chosen treasurer and James Fortesque was retained as secretary. The board of direct-

ors are: George W. McNeary, C. F. Whitney, F. A. Hinchcliffe, Kenneth Blake and Dr. J. F. Hovestadt. When some of the Bostonians at the show heard the election was pulled off they were much provoked because they felt that they were not given a square deal. That there will be resignations there is no doubt, and one member who is close to the inside said that at least fifty members would drop out.

**Horlick Shames City**—Mayor A. J. Horlick, of Racine, Wis., has made the common council of the Mitchell's home city blush for shame. Some time ago he proposed that the council purchase a motor car for the use of the fire chief, whereat he would make a gift of a duplicate of the car to the city for the police chief's use. The aldermen turned it down because of political reasons. On New Year's day, it develops, Mayor Horlick, himself a millionaire, drove a little Mitchell roadster to the city hall at Racine, summoned the police chief and formally made the gift to the chief. It is now stated on the best of authority that at the next meeting of the council, appropriation will be made for a Mitchell for the fire chief. Mayor Horlick has made good and the aldermen feel much ashamed.

**Minnesota Tax**—The wide open tax amendment decision recently handed down has brought joy to the hearts of the motorists of Minnesota, who are at present busy framing up the new law which will be presented to the legislature now in session. This decision means that the new law can with lawful propriety provide for the taxation of motor cars at the rate of \$1 per horsepower, A. L. A. M. rating. There are nearly 5,000 cars in the state, and if this bill becomes a law it will mean that

the state's income from this source will be in the neighborhood of \$150,000 this year and in an increasing ratio will amount to over \$200,000 a year for the next 10 years. The proposed law will also specify that this income shall be used entirely in the good roads work of the state highway commission and that the tax of \$1 per horsepower shall be in lieu of personal taxes on motor cars.

**Ford Men Made Happy**—Every employee of the Ford Motor Co. whose services have extended over a period of 12 months or longer, on December 28 received as a new year's gift from the company a check for either 5 per cent or  $7\frac{1}{2}$  per cent of his year's salary, this amount depending on the length of service. Every employee who has been with the company 1 year or more received 5 per cent of his 12 months' salary; if his service covers 2 years or more,  $7\frac{1}{2}$  per cent and the promise is given that the man who this year comes under the first division, if with the company a year from now will receive  $7\frac{1}{2}$  per cent, while the 2-year man will next year come in for an increase over the  $7\frac{1}{2}$  per cent.

**Hughes Wants a Tax**—Governor Hughes, of New York state, in his annual message for 1909 says that 809 miles of state roads have been completed during the past year. He explains that the difficulty of maintaining the highways has been largely increased by the use of motor vehicles. He recommends that a substantial license tax be imposed for the privilege of operating motor vehicles within the state. The proceeds would be devoted to highway repair. He said that such license fees in this state should be uniform with those of other states. He also said in part: "The reckless disregard of human life that is so frequently manifested in the driving of motor cars calls for drastic measures of protection both with regard to means of identifying vehicles and in providing an increased punishment where those guilty of criminal conduct seek to escape arrest."



ANNUAL DINNER OF AMERICAN MOTOR CAR MANUFACTURERS' ASSOCIATION HELD IN NEW YORK LAST WEEK

# MOTOR CAR DEVELOPMENT

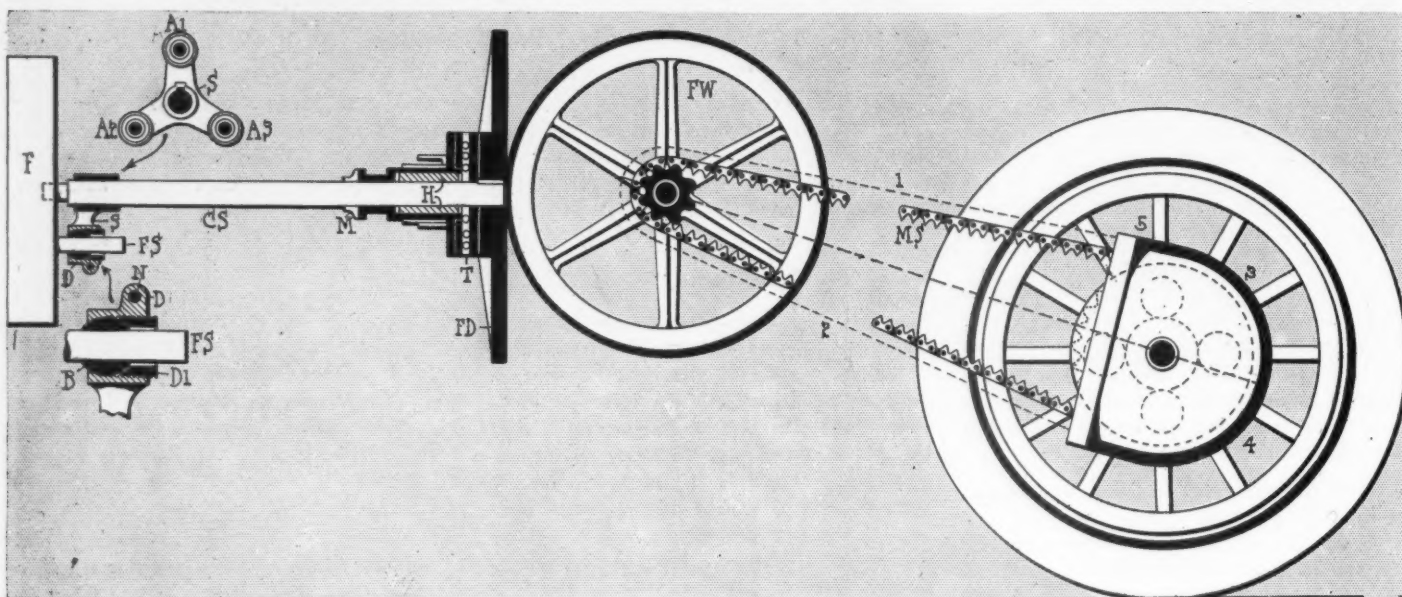


FIG. 1—IMPROVED FRICTION TRANSMISSION ON 1909 LAMBERT CARS

BESIDES continuing the use of friction drive on all of its four Lambert models for 1909, the Buckeye Mfg. Co., Anderson, Ind., has developed its friction system in two important respects: First, by discontinuing the shaft-drive used for a couple of seasons and substituting therefor an enclosed Morse silent chain; and, second, by placing the friction system nearer to the rear axle by using a flywheel on the motor and using a continuation shaft from the flywheel back and carrying the friction disk. Further, in all models, the contact between the friction disk and wheel is by sliding the disk and continuation shaft rearward instead of swinging the jackshaft forward to contact the friction wheel with the disk. In addition to these improvements, it might be noted that the three four-cylinder models carry the new Rutenber motor, with its crankcase-contained oiling system and having a vertical shaft at the right front of the motor, on top of which is the timer, and

the magneto located on the right front motor arm driven from the shaft through enclosed gears.

The accompanying detailed line drawing Fig. 1 shows the improvements in the transmission system. The flywheel F attaches to the crankshaft and connects through the continuation shaft CS with the friction disk FD, and the improvements consist in the scheme for shifting this shaft and disk rearward. To do this a steel spider S keyed on the continuation shaft has three arms A1, A2 and A3, each of which attaches to three flywheel studs FS, which screw into it. On each of these  $\frac{3}{4}$ -inch carbon steel studs is a  $1\frac{1}{8}$ -inch babbitt ball B loosely mounted on the stud and having embedded in its hub grooves graphite fillings to lubricate it and allow of easy slipping along the stud.

Each spider arm ends in a split half socket part D which fits over the babbitt ball and has another threaded socket part D1 which, when threaded into the end D, completes the socket and is locked therein by nut N, bringing the split socket D together. This ball-and-socket construction on each spider arm gives a universal action between the motor and friction disk. When changing speeds by pedal the friction disk and its shaft CS are carried forward, sliding toward the motor by the babbitt balls B sliding on the flywheel studs. This is done by pedal with ratchet lock and on the connection is a spring by which the disk FD can, if the car is running over rough surfaces, release very slightly from the friction wheel.

The use of a continuation shaft CS calls

for a careful bearing support which the company has accomplished as follows: The shaft is supported on a crosspiece of the car frame, being carried on this through a 4-inch Hyatt roller bearing H. Two thrust bearings are used, an 8-inch ball thrust T immediately in front of the friction disk FD, and at the forward end of the Hyatt roller bearing is a small ball thrust resting against a shoulder M on the shaft. The dummy thrust wheels used to back up the friction disk this year have been dropped on all models.

#### Morse Silent Chain Used

In the use of the Morse silent chain for transmitting from the cross shaft to the rear axle, the company claims a quieter drive than by shaft, and enclosing the chain removes the criticisms that have been aimed at chain transmission. The chain is on the right side and is 2 inches wide. Its cover is a four-part metal casing. One of the four removed in the illustration and the largest part remaining

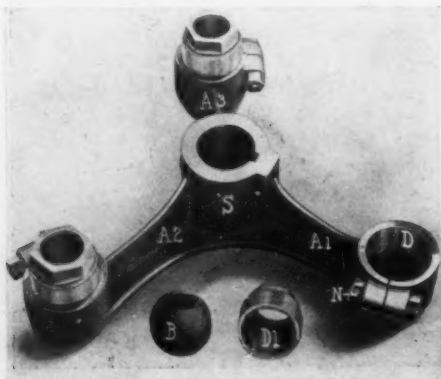


FIG. 2—SPIDER FOR FRICTION SET

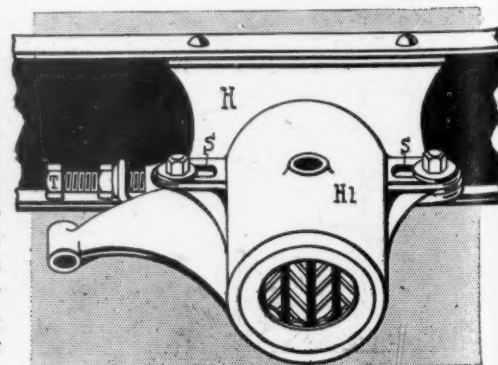


FIG. 3—LAMBERT JACKSHAFT SUPPORT



## IMPROVEMENTS IN LAMBERTS

is designated 1, while parts 3 and 4 form a housing for the rear axle sprocket for the chain. The case has a telescopic action at the line 5, where the front parts 1 and cover, forming the casing proper, slide over the parts 2 and 3, a leather facing at this point preventing the entrance of dust or leaking of oil and grease.

The cross shaft carrying the friction wheel is supported at each end on Hyatt rollers and two methods of adjustment are furnished on different models. First comes the old scheme, in which the shaft is carried in a swinging bracket carried on a bracket on the frame, and held in adjustment by turnbuckle, and having facilities for chain adjustment through the radius rod extending from the bracket to the back axle, and also having a turnbuckle for adjustment.

The other adjustment, illustrated in Fig. 3 consists of a bracket H fitted within the channel of the frame, the bracket H1 holding the end of the shaft slides on the top of this bracket, and carries a couple of slots S through which bolts pass from the bracket H, and by tightening of the nuts on which any desired adjustment is retained. On the bracket H is a vertical part at the rear end, in which is a set screw for making the adjustment.

The improved four-cylinder Rutenber motor used is readily recognized as a Logansport product with its separately-cast cylinders with valves on one side. The important arrangement with it is a vertical shaft A, Fig. 4, on the right front, on the top of which is the timer T and on the bottom the gear oil pump P which delivers the oil from the crankcase oil reservoir to the crankcase proper. Midway from this shaft is a horizontal spiral

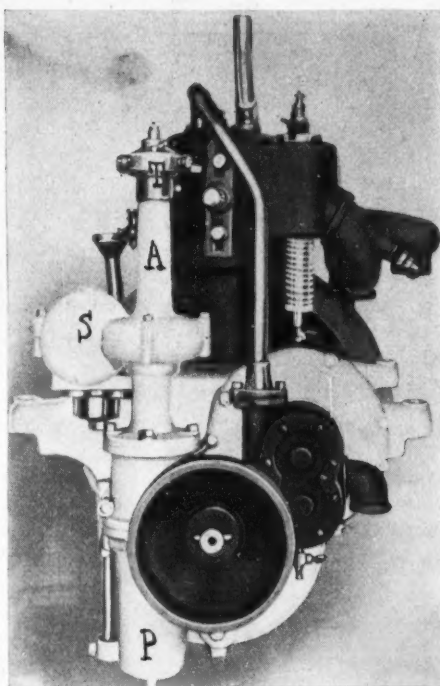


FIG. 4—LAMBERT MOTOR

gear from which the high-tension magneto is driven. The water pump occupies its old position on the forward end of the crankshaft and has the intake and return water pipes entering the cylinder heads.

### The Four Models

From a numerical viewpoint, model A1, the two-cylinder 20-horsepower runabout will occupy the premier position among the four models, the 1909 output of these being placed at 400 cars. This little runabout, or roadster, uses a Davis motor mounted transversely in front, the same as this year, and uses the new friction

scheme referred to, excepting that the fly-wheel studs have bushings instead of the babbitt balls. The little car employs single enclosed chain-drive, but not the Morse type. It is made with 95.5-inch wheelbase and 30 by 30-inch tires. Its front axle is a straight tubular member with Elliott ends and standard ball bearings for the front wheels. The rear axle uses four Hyatt bearings. The motor ignition is a single set with storage cell and two-unit coil; steering is through a Barnes worm and split-nut gear; the frame is a pressed steel channel section and springs are semi-elliptics of the triple action type.

Numerically, next to model A1 is model 30, a 25.6-horsepower five-passenger touring car and two, three or four-passenger roadster. It uses a 4 by 4-inch Rutenber, the new transmission scheme with Morse chain and has rear axle brakes of the expanding type increased from 8-inch diameter by 1½-inch width drum to 10 by 2-inch sizes; the spring suspension consists of front and rear triple-action semi-elliptics; the frame is a channel section pressed steel one; a storage battery ignition system is provided; the wheelbase measures 110.5 inches; tires 30 by 3.5 inches and the front axle is a straight tubular one with Elliott ends fitted with Standard ball-bearings.

### Features of Model 19

Model 19 is the third biggest output with 4½ by 5-inch motor and five-passenger body, and wheelbase increased from 105 to 117.5 inches. It uses the Morse chain-drive system. Different from the two preceding models is the equipping with two complete ignition outfits, a high-tension magneto and a storage outfit with double sets of plugs. The running gear

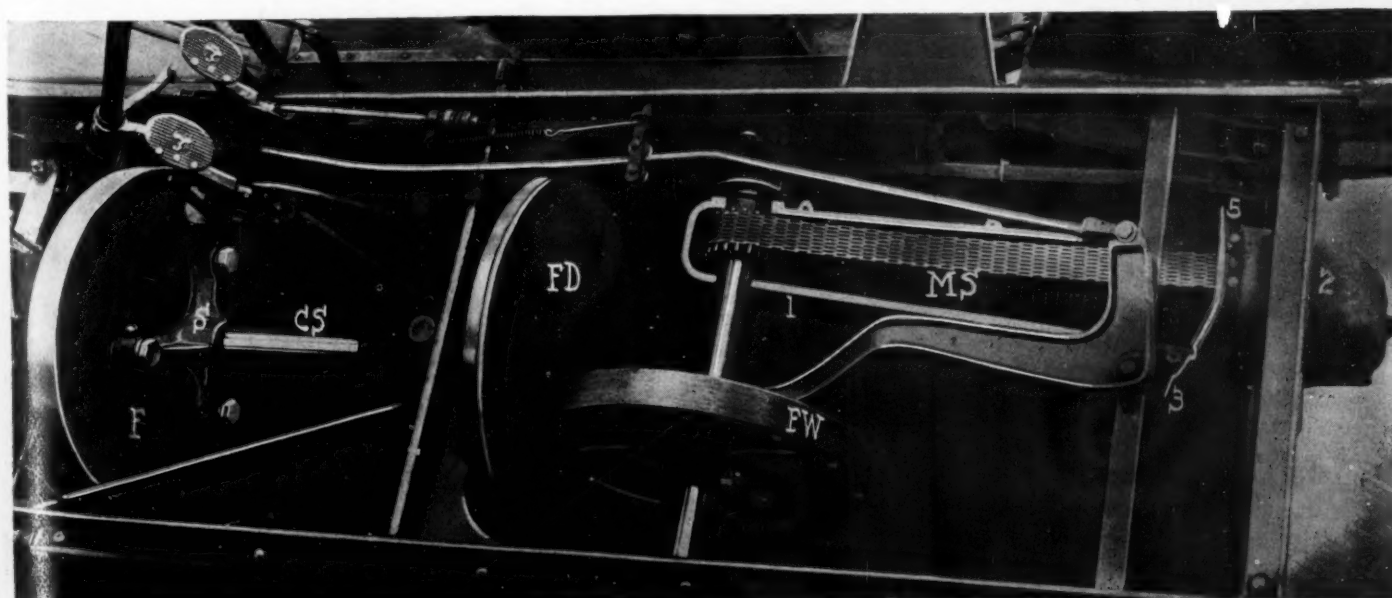


FIG. 5—ENCLOSED MORSE SILENT CHAIN DRIVE INTRODUCED ON LAMBERT CARS

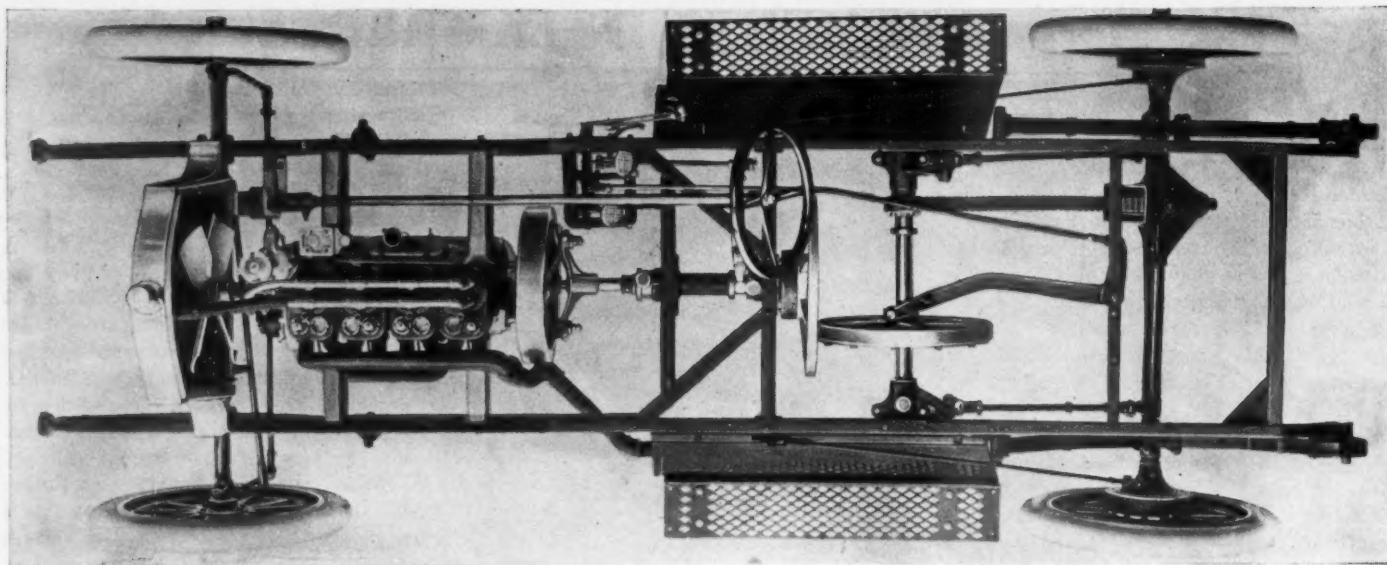


FIG. 6—CHASSIS OF LAMBERT MODEL THIRTY WITH PRESSED STEEL FRAME

uses elliptic rear springs mounted rigidly on the axle and carrying the spring on pivots at their top centers. The forward tubular axle is centrally dropped and carries the front wheels on Timken rollers.

The fourth model is B2, a continuation of the present model R, and which is a side chain-drive machine. It carries a  $4\frac{1}{2}$  by 5-inch Rutenber motor and seven-passenger body. The wheelbase is 106 inches and tires 32 by 4 inches. All of the Lambert models are provided with a gas-lamp equipment and the model B2 a folding glass front.

#### THE AMERICAN IGNITER

A decided novelty in the high-tension ignition field for motor cars is the American igniter which as illustrated in Fig. 2, looks like a big fat distributor T on top of a vertical shaft, with the four high-tension wires connecting with the spark plug. It is a distributor and more, for incorporated within the case T are a non-vibrating coil consisting of a primary and secondary winding; a mechanical make-and-break for the primary circuit and a high-tension distributor. In short the case T contains a complete ignition outfit save the battery and the spark plugs and weighs but  $3\frac{1}{2}$  pounds. The condenser used in connection with this igniter is carried in a small metal case beside the battery, there not being room within case T for it. Figs. 3 and 4 are an introduction to the interior, the cover C being removed and disclosing the revolving distributor disk D with distributing pin P which delivers to the contacts 1, 2, 3 and 4 in the cover C with which cables connect with the spark plugs. The primary coil P C is a ring-like winding fitting outside of the ring core R C of soft iron pieces within which is a fiber ring F R against which the core rests. Outside of the primary winding is the secondary coil S C, which in Fig. 1 is being removed by upsetting the case T and giving it a sharp blow. This secondary is a fiber spool wound in twelve sections and separated

from each other by  $1\frac{1}{8}$ -inch partitions, a construction intended to prevent breaking down the insulation. The coil will operate on  $\frac{1}{2}$  ampere and 6 volts. This secondary



FIG. 1

winding is not hampered by any wire connections, but is so designed that it can only be put in in one way and when so positioned automatically makes the proper connections which are fitted within the case

T. One end of it grounds in the bottom of the case and the other end W, fits against the contact point W1 in the cover with which connection is made to the point 5, from which the high-tension current is conducted to the collector pin P1 in the top of the distributor disk D.

Fig. 5 shows the bottom of the device where the make-and-breaking of the primary current occurs. The wire from the battery attaches at B W and the condenser wire at C W. One end of the primary winding connects direct with the binding post C W, and the other with the insulated ring R, which carries a rocking lever arm M, pivoted at one end and carrying a roller N at the other end, against which the four cams H on the revolving shaft K are formed integrally. On the lever M is one of the platinum points D and the other one is D1 on the end of an adjustable screw E with a large knurled end E1 for adjustment and a spring locking bolt F for retaining any adjustment of the screw E. With one of the four cams H striking the roller N, the platinum contacts D and D1 are brought together and the circuit made being through the roller N to cams H and thence grounded through the shaft K back

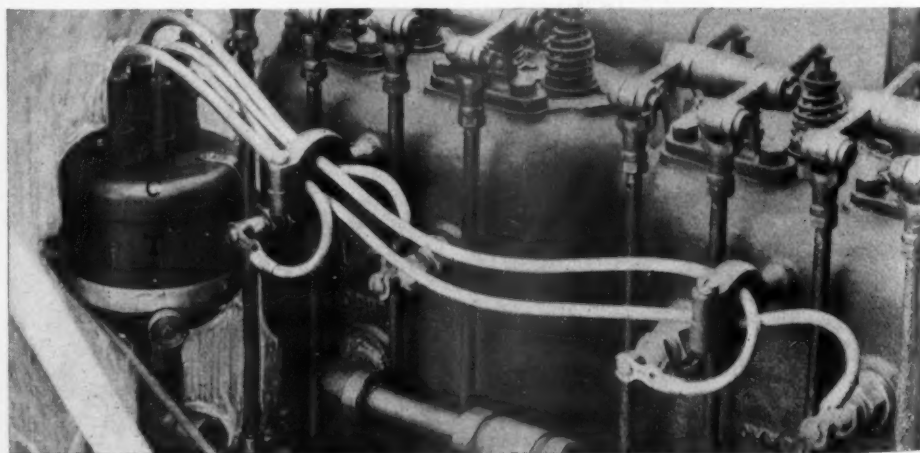


FIG. 2—AMERICAN IGNITER ATTACHED TO MOTOR



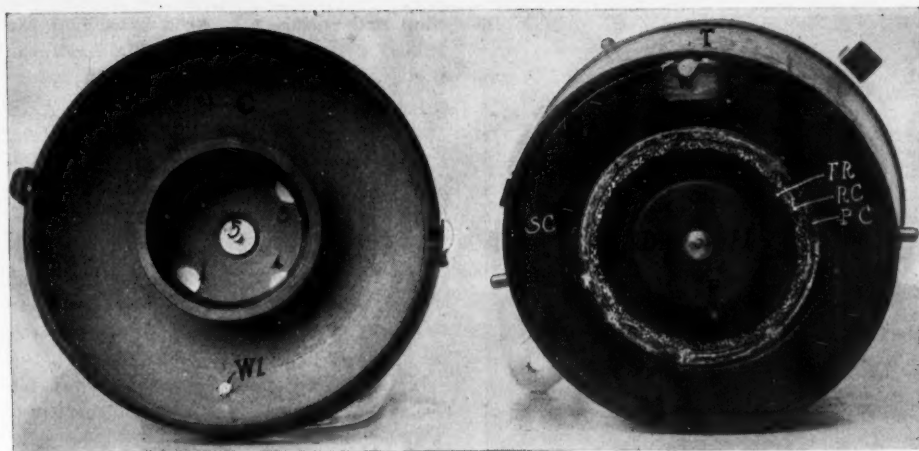


FIG. 3—COVER REMOVED FROM AMERICAN IGNITER

to the battery ground. Whenever a cam is not contacting with the roller N the circuit is open. With four cams H there are four makes and breaks per revolution and the spark occurs on the break, just as the cam H leaves the roller N. The cover C1 is held in place by finger screws and knurled lock nuts. Variations in timing are made by oscillating the entire case T, around the shaft K by connections with the handle Z.

Lastly in connection with this igniter, manufactured by the American Electric Fuse Co., Muskegon, Mich., is the carrying of the case T and all other parts on the shaft K through two race ball-bearings, illustrated at J and J1 in Fig. 4, which is a vertical section of the igniter. These bearings carry the entire load and are packed in grease so as not to call for attention during a whole season. The case T is vulcanized rubber, made heat and moisture-proof.

#### MOTOR CAR LITERATURE

The Automobile Blue Book of Wisconsin, published by the Auto Guide Publishing Co., Milwaukee, and prepared under the direction of James T. Drought, secretary of the Milwaukee Automobile Club, contains a list of the official garages throughout the state, a directory of the motor car dealers and liveries, the supply men, and all manufacturers in the state. In addition is a list of the gasoline dealers, machine shops, etc. Further information consists of a hotel list throughout the state, in which hotels recommended by the Milwaukee club are mentioned, and the members of the Wisconsin State Association given. The route portion contains 135 or more routes throughout the state of Wisconsin, each route being accurately described so a motorist would have no trouble following without having to stop and ask questions. In the back of the book is a set of four road maps, illustrating different

sections of the state in which the better car roads are marked in red lines. The maps go sufficiently into detail to be of practical value and serve as a guide.

C. A. Shaler, of the Shaler company, has a small booklet entitled "Care and Repair of Tires," giving information on his vulcanizer as well as hints on the care of tires.

"With the Peerless Old Glory Team" is the title of a book reminiscent of the 1908 Glidden tour and in which the performance of the Peerless team is illustrated and described. This company has a catalog on its limousine cars in which each is illustrated and alternate pages of the book are illustrated with every-day city scenes, depicting the field of the limousine car.

The Carpenter Steel Co. is circulating a four-page leaflet headed "The Vanderbilt Cup Race From the Steel Maker's Standpoint," drawing attention to the use of its steel in Robertson's Locomobile which won the Vanderbilt cup race.

The November Bulletin of the Automobile Club of America shows that the club during the month placed signboards on 16 miles of road. The book also contains road routes from Philadelphia to Oxford and return, Philadelphia to Wilmington and return, Philadelphia to Essington and return and other short routes.

The Brush Runabout Co. has published a booklet illustrating the great efficiency run of its five cars, covering Detroit to Chicago, Minneapolis, Kansas City, Cincinnati, New York, Boston and other parts. Photographs showing the cars in different parts of the country are reproduced and a map of its complete itineraries included.

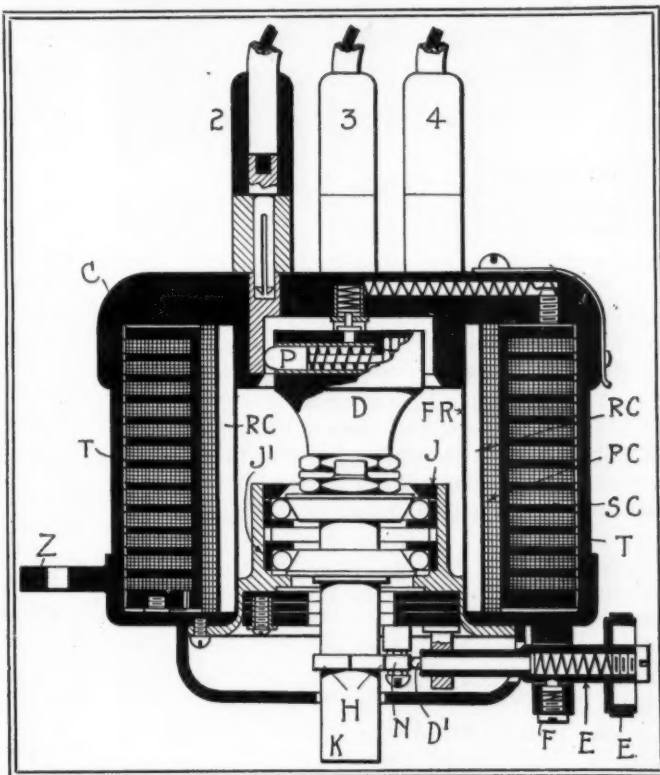


FIG. 4—SECTION OF AMERICAN IGNITER

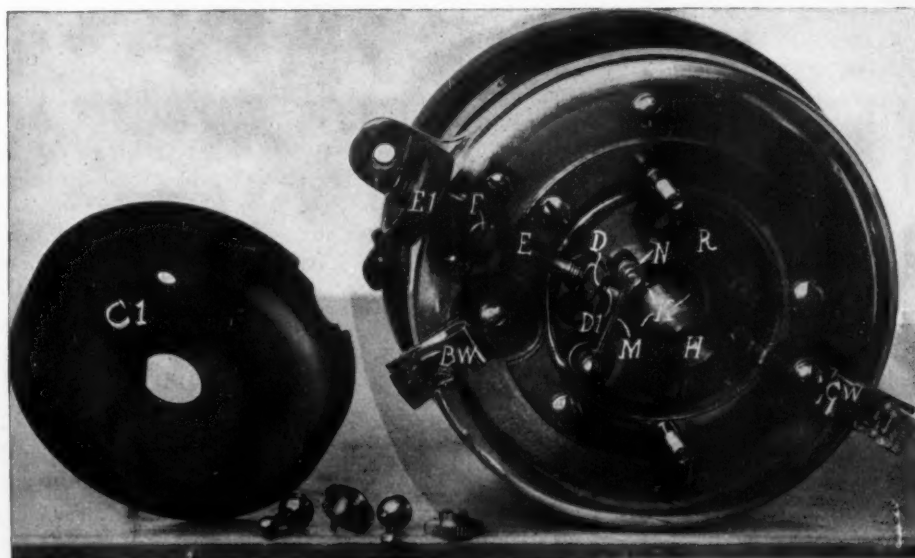
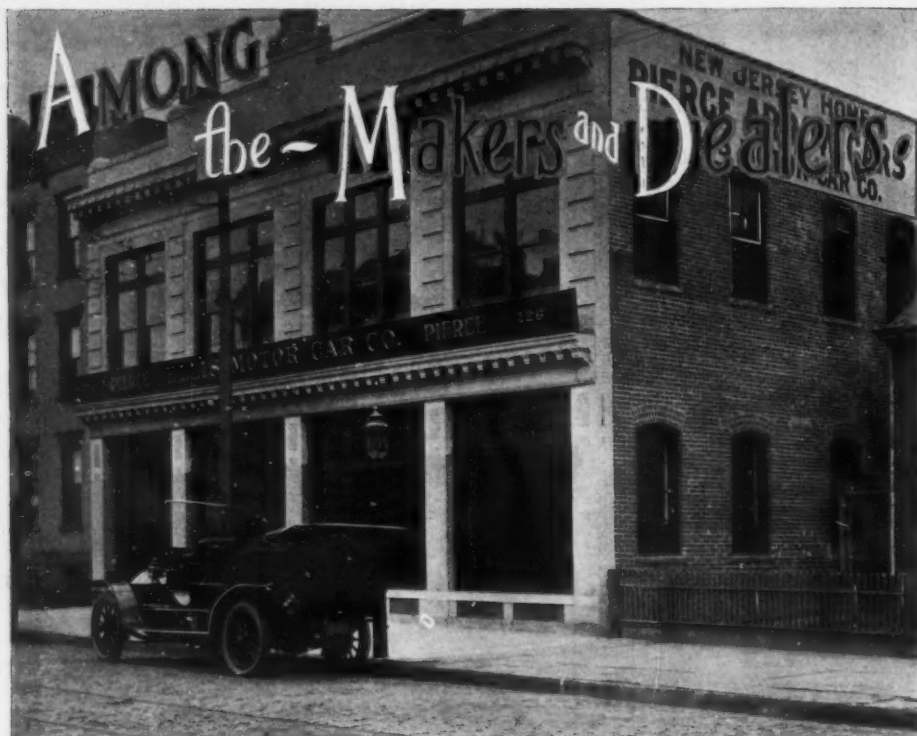


FIG. 5—PRIMARY INTERRUPTER IN AMERICAN IGNITER



NEW SALESROOM OF ELLIS MOTOR CAR CO., AT NEWARK, N. J.

**Big Garage Opened**—The new \$25,000 garage of the Hokanson Automobile Co., East Doty street, Madison, Wis., has been formally opened.

**Blake Joins Knox**—Robert W. Blake, formerly manager of the Philadelphia Knox branch, has joined the sales force of L. E. French, Philadelphia agent for the Pullman car.

**Takes the Inter-State**—The agency in Washington, D. C., for the Inter-State has been given to the Dewey Garage Co., which has also taken the White steamer agency, formerly handled by the Cook & Stoddard Co.

**Downey Sells Out**—Jos. Downey, the well-known race driver, who conducted a garage and renting service in Boston for several years, has sold out his business and will take a vacation until summer, when he expects to secure an engagement driving racing cars for a New York firm.

**Rapid's New Buildings**—The completion of an office building, 60 by 80 feet in size, will give the Rapid Motor Vehicle Co. one of the largest offices of any motor company in the country. The work is now being completed. The big 60 by 300 feet addition to the factory is now nearly ready. This addition is two stories high and is of steel and concrete.

**Express Company Formed**—The formation of an express company to do a package business between Detroit and Wyandotte, Mich., is announced, City Treasurer Edwin A. George, of Wyandotte, and G. W. Blake being the promoters. The company has ordered a number of Grabowsky power wagons and hopes to develop a business which will warrant an expansion of the same business to other suburbs. Par-

ticular attention is to be paid to the delivery of parcels from department stores in Detroit, to suburban purchasers.

**Building at Burlington**—The Automobile Supply Co. and Hugh Agner are building garages at Burlington, Wis., to be opened about March 1.

**Opens in Portage**—George Bremmer has opened a garage and repair shop in the Schulze building, Portage, Wis., and will take up several lines of agencies in the spring.

**New at Neenah**—The Auto Supplies Co., of Neenah, Wis., has opened for business at 111-113 Commercial street. S. F. E. Ballister has been elected president; F. A. Leavens, secretary and treasurer, and Dr. E. J. Smith, H. K. Babcock and C. L. Kimball, directors.

**Chain of Branches Planned**—The Hokanson Automobile Co., of Madison, Wis., western Wisconsin agent for the White steamer, Buick and Ford, will establish a branch agency and garage service at Portage, Wis. It is planned to establish a chain of these branches throughout the territory before spring. James Jones has been appointed manager of the Portage branch, which will be located in the Stotzer building in that city.

**Boise's Latest**—The Inter-Mountain Automobile Co. was recently incorporated at Boise, Idaho, with a capital stock of \$25,000. The officers of the new company are: J. D. Moore, president and general manager; George Green, cashier of Boise Bank of Commerce, secretary and treasurer; C. W. Wayland, vice-president; directors, the above officers and J. A. Fennell and J. D. Lamb. The new company will carry supplies, will have a repair

shop and will handle, as a branch of the Inland Auto Co., of Walla Walla, Wash., the Franklin and Studebaker cars.

**Handling Columbus Electrics**—The Akin Motor Car Co., Fourth and Prairie streets, Milwaukee, state distributors of the Stevens-Duryea, has received the agency for the Columbus electric line.

**Adds the Mora**—The Columbus Buggy Co., of Minneapolis, the coming year will have a full line of motor vehicles, announcing the Mora as the latest addition to its stock. In addition to the Mora, the Columbus Buggy Co. handles the Columbus electric, a motor buggy line and the Frayer-Miller trucks.

**Will Make Magnetos**—J. Angell Bott, J. B. Coffinberry, H. J. Fischer, Jas. H. McNicholas, E. H. Douglass and other Clevelanders, together with several Michigan parties have incorporated the Fawn River Mfg. Co. to manufacture high-tension alternating current magnetos for use on motor cars and boats. The plant is now being installed with modern machinery at Constantine, Mich. The magneto will be exhibited at both the Cleveland and Detroit shows.

**New Kissel Agency**—The Kisselkar Co., of Milwaukee, has been incorporated with a capital stock of \$10,000 to take over the agency for the product of the Kissel Motor Car Co., of Hartford, Wis., in Milwaukee. The incorporators are E. J. Edwards, L. W. Clough and Albert R. Denu. E. J. Edwards has been appointed Wisconsin representative and manager of the company. Offices, salesrooms and garage have been established at Fourth and Prairie streets, Milwaukee.

**Garage For Newcastle**—Harry E. Jennings, owner of the Central States Coöperage Co. at Newcastle, Ind., the home of the Maxwell company's Indiana plant, has decided to give that city an additional garage, built on an elaborate plan. He has purchased a lot 40 by 130 feet on which a three-story building will be erected. A part of the new building will be devoted to the general offices of the coöperage company, while the remainder will be devoted to a public garage.

**Cline Taxicab Magnate**—Arthur L. Cline, who operates the Auto Livery Co., has secured a controlling interest in the Federal Taxicab Co., of which E. R. Thomas, the Buffalo manufacturer, was formerly the head. Mr. Cline will operate the Federal Taxicab Co. separately from the Auto Livery Co. Mr. Cline has given a deed of trust chattel to S. V. Hayden and J. C. Heald to secure E. R. Thomas in the sum of \$22,500, the chattels being located in the Panorama building, which is used by the Federal company as a garage. Mr. Cline is building a new garage for the Auto Livery Co. and it will be ready for occupancy about February 1. In addition to a number of taxicabs, the Auto Livery Co. also operates a service of touring cars for hire. Fred Thomas,



formerly manager of the Federal Taxicab Co., has gone to Boston to assume charge of the taxicab business of E. R. Thomas in that city.

**Britton's New Place Ready**—R. D. & C. O. Britton, representatives of the Maxwell and the Stoddard-Dayton, at Hartford, Conn., have practically completed their remodeled garage on Allyn street and are now moving in.

**Shafer Adds the Pullman**—W. A. Shafer, who has the agency for the Glide in New England with headquarters in Boston, has just closed a contract whereby he will handle the Pullman car also. The Pullman car was formerly handled by the F. E. Randall estate.

**Change in Knox Agency**—The Knox car, which was formerly represented in Philadelphia through a branch house and later—the commercial end—by the Foss-Hughes company as agent, will hereafter be handled in the Quaker City by the North Philadelphia Auto Station, at 3425 North Broad street.

**Petrel Not Affected**—The Petrel Motor Car Co., of Kenosha, Wis., will not be affected by the plan of the Eagle Chandelier Co., of Chicago, to lease the former Visible Typewriter Co. factory at Kenosha. The Petrel company occupies only a part of the big building, which is now the property of the Badger Brass Mfg. Co., maker of Solar lamps, and the proposed lease of the Eagle works includes only the remaining space.

**Kopmeier in Business**—The Kopmeier Motor Car Co. is the name of the new firm that will handle the American and Detroit electric lines in Milwaukee. Formal announcement was made January 1 that temporary quarters have been established at 457 Milwaukee street, with Robert Drach as manager. A large garage and salesrooms will be erected on the east side of Milwaukee at once. It is reported that a west side branch will be established on Seventh street, near Grand avenue.

**Getting Taxicab Habit**—The taxicab game has proved so successful in the east that Philadelphia's summer annex—Atlantic City—is to have similar conveniences. A company consisting of Louis Kuehnle, Edward Bader, Dr. B. F. Coll, Charles Gondolf and William Harris has been formed to push the scheme, which, with the miles of newly-paved avenues, seems sure to be successful. The first cab arrived Friday week, and was immediately put to work between the depots and the prominent hotels, and the remaining nineteen of the first installment will be delivered at irregular intervals, until by next Easter the entire service will be installed and in operation. A 40-cents-a-mile basis of charges has been adopted, and the organizers of the new company expect to make big inroads into the lucrative horse-drawn bus business of the resort during the coming season. Reading, "the Dutch capital," also has adopted the taxicab, and

several of the cars are now in operation there. Scranton parties have also formed a company and put several experimental vehicles at work.

**May Open Branch**—It is reported that the Kissel Motor Car Co., of Hartford, Wis., will establish a branch at Madison, Wis., the state capital, and that quarters have been leased on East Wilson street for that purpose.

**Joins Locomobile Forces**—F. A. Brezina, formerly assistant purchasing agent of the Electric Vehicle Co. and later of the Timken Roller Bearing Co., has entered the service of the Locomobile company in a similar capacity.

**Wanderer Returns**—Harry Wollaver, for many years with the Boston Columbia branch, and who resigned last summer to go into business in Nova Scotia selling motor boats, has returned to Boston and he is now employed with the Whitten-Gilmore company, Boston agent for the Chalmers-Detroit and Thomas.

**Change of Name**—The Indiana Carriage Co., for many years an exclusive dealer in carriages and buggies, has just changed its name to more fully describe the nature of its present business. The new name is the Indiana Carriage and Automobile Co., and the reorganized company has \$50,000 capital. Arrangements have been made to handle the Jackson and Regal next season, and a line of motor trucks may be ordered.

**Making Improvements**—Extensive improvements are being made by the Hearsey-Willis Co., dealer in motor cars and carriages, Indianapolis. Alterations which will give a more advantageous display of cars are being made and a large freight elevator is being installed. Several thousands of dollars will be spent in the work. The company has arranged to represent the Waverley electric, White steamer, and the Rambler and Mitchell gasoline cars this season.

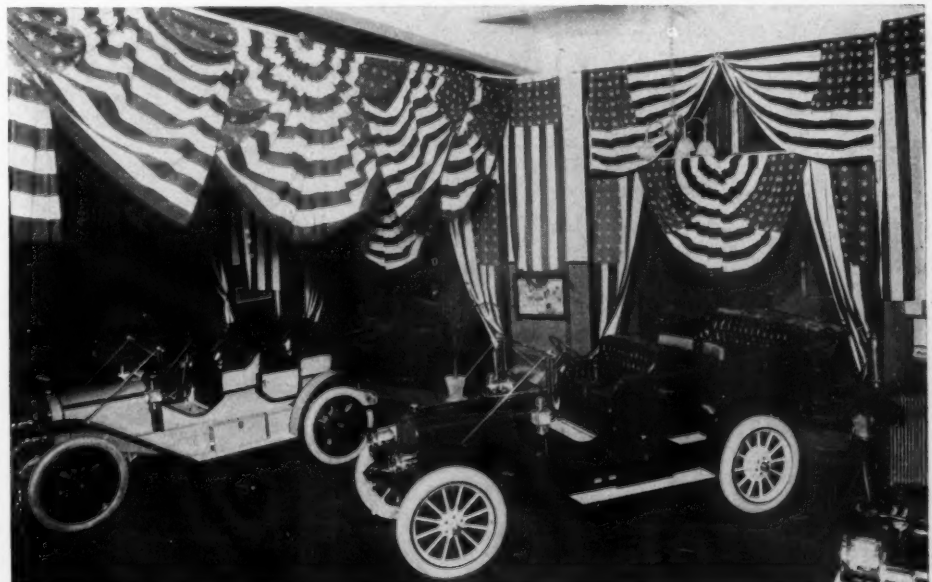
**Flint to Move**—Elliott Flint, of the Flint Motor Car Co., Packard agent at Providence, R. I., has leased the large store adjacent to the Packard agency at the corner of Washington and Aborn streets.

**Seeks Buggy Plant**—Charles R. Davis, of Milwaukee, Wis., is said to be investigating conditions at Manitowoc, Wis., with a view to establishing a factory for the manufacture of motor buggies. The buggy is the invention of Louis Splitt, of Milwaukee. It is believed that the factory will be located at Manitowoc.

**Will Build New Place**—Edward G. Bur-off, of Watertown, Wis., who recently sold his garage building to the Copeland-Roach Motor Car Co., representative of the Rambler, will erect a new garage and repair shop at Fifth and Main streets, Watertown. The building will be 22 by 75 feet, two stories high, and fireproof.

**Doings in Pontiac**—The Monroe Body Co. is now moving its Jackson branch to Pontiac, Mich., and is building two new additions to its Osmun street plant which will double its capacity. The Auto Top and Trimming Co. has purchased the plant of the Standard Vehicle Co. on Osmun street and has removed into its new quarters. The capacity of the company will be tripled. The Oakland Motor Car Co. has an addition to its plant nearly completed, which will increase its capacity nearly 75 per cent.

**New Plant Under Way**—The new plant of the Rider-Lewis Motor Car Co., which is moving from Muncie, Ind., to Anderson, Ind., is under way. There will be a main building 423 feet long and 140 feet wide, one story high, and an office building 50 by 40 feet and two stories high. Three models, all built on the same type of chassis, will be built. The car will be equipped with a six-cylinder engine with overhead valves and developing 40 horsepower.



PRIVATE SHOW OF RAMBLERS IN NEW YORK STORE, 38-40 WEST SIXTY-SECOND STREET



# Legal Lights and Side Lights



## LEGAL KNOWLEDGE SAVES THEM

**C** B. Decker, of Boston, and George O. Dow, New York city, en route to Boston from New York, tell of a narrow escape they had from arrest between Leicester and Spencer and how Decker's smattering of Massachusetts law relating to motor cars just saved them. They had left Spencer just after sundown, but whether they were in Spencer or Leicester they were unable to determine, when a constable jumped into the road in front of them, showed his badge and informed them they were under arrest. They had not been traveling fast and knew it could not be for speeding. So Dow inquired the reason for the hold-up and was informed that contrary to law their lights were not burning. It was then quite dark. Decker at this point interposed and said they'd look the law up. He produced a book containing the Massachusetts laws and read the constable that passage which says lights must be burning 1 hour after sundown. Their watches showed they had still 30 minutes left. The constable, crestfallen, allowed them to go on their way, telling them that while he didn't dare arrest in the face of the law, he would run them in if they were in town within 5 minutes after the expiration of 30 minutes. They were in Worcester in that time. Their carbide had run out and they could not replenish it until they got to Worcester, though they themselves admit the lights should have been lighted as it was quite dark. However, this incident serves to illustrate the working of this particular law.

## MAY LICENSE DRIVERS

The Milwaukee common council is considering an ordinance that provides for the licensing of drivers. Owners and chauffeurs, reinforced by members of the Milwaukee Automobile Club, are strenuously opposing its passage. The ordinance provides that no person shall operate a motor vehicle in Milwaukee unless the person is over 21 years of age and shall have first procured a license. The examining commission is to consist of the secretary of the city civil service commission, an electrical engineer and a practical machinist. The examination feature, it is believed, would prove a great handicap to many owners who drive their own cars. They claim that mere lack of knowledge of the mechanical construction of a machine does not in any way detract from a person's ability to be a careful and conscientious driver. Alderman Corcoran,

who introduced the ordinance, says: "It is not my idea that a man must be a master mechanic in order to run a car, but the one feature of the ordinance as it now stands which I think ought to be retained, is that clause pertaining to the licensing, which gives the mayor the privilege of revocation for cause. If a man has been arrested and convicted twice, there is no reason why he should be allowed to have a license. I like the motor car and I do not intend to work a hardship on any one."

## BADGER OUTLOOK BRIGHT

It is 2 years since the Wisconsin legislature met, and in those 2 years there has been a remarkable change of sentiment on the part of the representatives of the rural districts. The clubs that will go before the 1909 legislature, which meets in January, will find a change of front. The antagonism will have disappeared and the needed legislation will have an excellent chance of passing. No radical changes will be asked by the owners. The opposition, now reduced to a minimum, will ask that all penalties for violations of laws be increased, and the owners will not raise strenuous objections, because they believe in observing the laws and the penalties can be low or high insofar as they are concerned. They are trying to keep violations to a minimum, and believe that a slight increase in penalties may help them in this. There will be at least 50 per cent owners of cars among the entire membership of the legislature, as against 10 per cent in 1907. The rural representatives have found, through the medium of the Milwaukee club's many tours and reliability contests this year, that as a rule the drivers exercise great care on country roads. Only a small percentage of the entire body of owners and drivers show any disposition to be reckless, and the legislature will no doubt take this into consideration and legislate only against this small-sized contingent of undesirables.

## LIGHTS MUST BE SHOWN

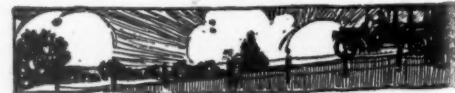
Motorists are much interested in the decision recently handed down by County Judge Stephens, of Rochester, N. Y., who has affirmed the judgment of Police Justice Chadsey, of that city. The latter convicted George J. Bauer of violating the motor vehicle law because Bauer failed to have the red tail light of his motor car in working order between sundown and sunrise. Bauer's lamp had gone out after he had lighted it, according to his defense, and he claimed he should not be punished for an accidental breach of the law. The opposite view was taken by Justice Chadsey, who imposed a \$10 fine on Bauer for the infraction of the law.

## CASE OF THE WORM TURNING

An instance of the turning of the worm was brought out last Saturday in Boston when Bartholomew J. Griffiths, a peddler, pleaded guilty to a charge of violating the street regulations and was fined \$5. Incidentally it brought out the fact that the Safe Roads Association intends to see that drivers of horse-drawn vehicles as well as motorists must obey the laws. On November 11 Dr. Daniel F. Jones was driving into Boston in his motor car to perform an operation, when on Commonwealth avenue he met a team driven by Griffiths, which was on the left-hand side of the road. It is a very wide thoroughfare divided by tracks, being practically two streets in one. Dr. Jones supposed Griffiths would get over on his right side, but he not only refused to do so, but stopped his team and blanketed his horse, meanwhile abusing the physician with profane language. Dr. Jones was detained about 15 minutes so he took the number on the team and he reported it to the Safe Roads Association November 11. Mr. Bissett, the investigator, went to work and finally found that the team was registered in Somerville so he found Griffiths and learned that he had been driving the team on the day in question. A warrant was sworn out for his arrest and Attorney Homans appeared to prosecute the case for the Safe Roads Association. Dr. Jones told his story to Judge Fabyans and Griffiths pleaded guilty and was fined. On the charge of profanity it was found that the complaint had been received too late to be prosecuted. The Safe Roads Association intends to see that drivers of all vehicles must obey the new regulations that went into effect on January 1.

## OHIO IN A QUANDARY

Unless the Ohio state law at present in force is amended at the coming session of the legislature, a queer angle will arrive when yearly licenses expire. The trouble comes from the fact that the law does not provide for different colored tags each year, and unless an amendment is passed it will be impossible to force renewals. The state association undoubtedly will attempt to amend the bill this month, but because of the white-hot opposition of some members of the state legislature any such attempt may be killed. A number of other amendments have been proposed, but State Registrar Caley fears the bill will be declared unconstitutional if too much is done to it. If any amendment is passed at all, another will be proposed, taxing commercial wagons.







# Brief Business Announcements



**Columbia, S. C.**—E. C. Lipscomb has been appointed manager of the E. A. Jenkins Motor Co.

**Springfield, Ill.**—The Auto Taxicab Co., of Chicago, has increased its capital stock from \$30,000 to \$60,000.

**Elizabeth, N. Y.**—The Elizabeth Automobile Co., Inc., is to be the representative of the Franklin during the coming year.

**Pittsburg, Pa.**—The Consumers' Auto Supply Co., of which Clay Manville is the manager, has removed to 412 Diamond street.

**Austin, Tex.**—The Auto Co. of Houston has been incorporated with a capital stock of \$1,000, by H. T. D. Wilson, H. S. H. Wilson and Van Curtis.

**San Francisco, Cal.**—H. C. Prentiss, formerly connected with the Winton Motor Carriage Co., has joined the selling forces of the Pioneer Automobile Co.

**Boston, Mass.**—The Adams Motor Transfer Co., of this city, has been incorporated with a capital stock of \$100,000, and will do a general motor car business. The incorporator is W. E. Eldridge, of Dorchester, who is president and treasurer.

**Boston, Mass.**—The Kennedy Ideal Car-bureter Co., of this city, has been incorporated with a capital stock of \$25,000, and will do a general motor car business. The incorporators are C. Kennedy, of Newton, who is the president, and W. E. Spear, of Boston, treasurer.

**Albany, N. Y.**—The Nightingale Whistle Mfg. Co., of New York city, has been incorporated with a capital stock of \$1,000, and will manufacture whistles for motors, tire inflaters, air compressors, etc. The incorporators are G. Stoddard, E. L. Keer and E. H. Carpenter.

**Springfield, Ill.**—The Streator Motor Car Co., of Streator, has been incorporated with a capital stock of \$30,000, by J. C. Barlow and L. P. Halladay. The Carl Klemp Co., of Chicago, has been incorporated with a capital stock of \$2,100, by Carl Klemp, H. T. Kett and T. E. Rooney.

**Albany, N. Y.**—The Scientific Research Co., of New York city, has been incorporated with a capital stock of \$100,000, and will manufacture motor cars, motor boats, etc., as well as machinery and plants. The incorporators are A. E. Ranney, A. M. Day and A. J. Robinson.

**Wyandotte, Mich.**—Edwin A. George and G. W. Blake, both of this city, are the backers of a motor express service, which is to be maintained between Detroit and western suburban points, including River Rouge, Delray, Wyandotte, Trenton and other adjacent territory. A number of Grabowsky power wagons are to be used,

and a central collecting station is to be maintained in Detroit. The service will probably start February 1.

**Philadelphia, Pa.**—The Standard Motor Car Co., of 616-618 North Broad street, has secured the agency for the Speedwell.

**New York**—Plans have been filed for the erection of a twelve-story and basement building for the B. F. Goodrich Co., to be located at 1780-82 Broadway.

**Indianapolis, Ind.**—The Fort Wayne Automobile Co., of Fort Wayne, has been incorporated with a capital stock of \$10,000, by C. E. Gilson and C. W. Warren.

**Des Moines, Ia.**—The new garage for the Capital Auto Co. which is being erected on Eighth street, is rapidly nearing completion, and the company expects to be located in its new quarters very soon.

**New York**—The Marion-Overland Automobile Co. has been granted permission by the supreme court of New York to change its name to the Overland Co. There will be no change in the officers or stockholders of the concern, the only change being in name.

**San Francisco, Cal.**—A number of motor car agencies have leased the property on Van Ness avenue, between Birch avenue and Fulton street, and will erect a one-story brick building to be used as a garage. Among the companies interested in the scheme are the Maxwell agency, the Mobile Carriage Co., the Pierce-Arrow agency, the



**Jersey City, N. J.**—Cable Pneumatic Tire Co.; capital stock \$500,000; to manufacture tires and other accessories; incorporators, J. F. Scannell, F. A. Macgowan.

**Belleville, Ill.**—Model Automobile and Garage Co.; capital stock \$2,000; to operate a garage and manufacture motor cars and accessories; incorporators, Joseph and E. L. Schwarz.

**Joliet, Ill.**—Van Guard Mfg. Co.; capital stock \$25,000; to manufacture motor cars and accessories.

**Newark, N. J.**—Manhattan and Essex Auto Express Co.; capital stock \$100,000; to do a general transportation business; incorporators, O. M. Jackson, G. M. Hammell, Newark, and V. S. Richardson, of East Orange.

**Brooklyn, N. Y.**—Bath Beach Garage and Machine Co.; capital stock \$2,500; to manufacture and deal in motor cars and maintain a garage; incorporators, G. E. Reuners, I. L. Carroll.

**Austin, Tex.**—Motor Transfer Co. of Fort Wayne; capital stock \$10,000; incorporators, A. C. Majors, H. J. Heenan.

**Richmond, N. Y.**—North Shore Garage; capital stock \$1,500; to manufacture, repair and lease motor cars, carriages, etc.; incorporators, P. M. Freund and M. M. Schloss.

**Massillon, O.**—Jewell Motor Car Co.; capital stock \$150,000; incorporators, H. A. Coxton, O. P. Bernhart and F. F. Taggart.

**New York**—Baker Vehicle Co.; capital stock \$1,000; to manufacture motor cars and accessories; incorporators, N. Platt, F. N. White and R. C. Norton.

**Pacific Taxicab Co.** and the Continental Tire Co. The building is to be ready for occupancy early in March.

**Pittsburg, Pa.**—B. F. Benson has been appointed agent for the Studebaker car in western Pennsylvania, and will erect a garage on Craig street near Luna Park.

**Allentown, Pa.**—The Lawfer Automobile Co. has secured the agency for the Oakland. This company was also recently appointed agent for the Chalmers-Detroit.

**Albany, N. Y.**—The Tourist Auto Car Co., of Niagara Falls, has been incorporated with a capital stock of \$10,000 by J. H. Brydges, E. M. Wheeler and S. C. Fagard.

**Guthrie, Okla.**—The Citizens' Motor Car Co., of Oklahoma City, has been incorporated with a capital stock of \$25,000, by W. Atwood, A. C. Newman and J. W. Densford.

**Philadelphia, Pa.**—Louis J. Bergdoll has taken title to the twenty buildings at 1319-1337 Wood street and 1322-1340 Carlton street, and will use the ground for an extension to his garage at Broad and Wood streets.

**Jefferson City, Mo.**—The C. & O. Automobile Co., of St. Louis, has been incorporated with a capital stock of \$6,000, by C. H. Duffer, E. E. Rueter and L. Koemerous.

**Hutchinson, Kan.**—The St. Joe Motor Car Co., of Elkhart, Ind., has succeeded in raising the additional stock necessary to secure the removal of the plant to this town, and final arrangements will be completed within a few days. In the future the company will be known as the Sunflower Motor Car Co.

**Los Angeles, Cal.**—F. M. Hoblitt, who is representing the American Locomotive Co., is looking over the local field with the intention of running a motor car freight line from this city to Wilmington. A regular schedule is to be maintained, and a company will be organized to look after the business here.

**Detroit, Mich.**—The Northern Motor Car Co. has filed articles at Lansing decreasing its capital stock from \$500,000 to \$1,000. The Northern Motor Car Co. has been practically dissolved since the consolidation with the E.-M.-F. Co., but the nominal capital will serve to keep the concern in existence until all debts are paid.

**Nashville, Tenn.**—The Southern Automobile Co. has sold out its business to the Chester Motor Car Co. John W. Chester is to be the president of the new concern, and the headquarters will be located at the garage on Broad street. Mr. Kenner, who has been president of the Southern Automobile Co. since its formation, is to retire, as will also C. C. Gilbert.

# STORY OF THE MANUFACTURE OF RUBBER

**C**IVILIZATION first heard of rubber in Herrera's account of the second voyage of Columbus in the year 1493, where he speaks of elastic balls made by the natives from the gum of a tree. The first authentic account of its practical use was recorded in 1745 by the leader of a French governmental expedition returning from South America, who reported that the natives secured from the juice of a tree a certain gum which was very elastic, impervious to water and used in making bottles, shoes and squirt guns. Thirty years later it was introduced to commerce when an Englishman brought from Assam, India, a soft spongy substance which would erase lead pencil marks and which afterwards became known as India rubber.

Many primitive uses were found for this wonderful gum, but owing to its susceptibility to changes of temperature, which rendered it sticky and more or less fluid, rubber did not come into its own until early in the last century. At that time it was discovered after a great deal of experiment, that by mixing sulphur with crude rubber and subjecting it to a high degree of heat these former deficiencies were eliminated and a material was produced which was both tough and elastic, and would retain those properties under varying temperatures. This process of curing was called vulcanization and is the basis of rubber making today. So great has been the development of rubber manufacture since that time that its products now exceed a value of five hundred million dollars annually.

## Rubber Gum Not a Sap

Contrary to the popular impression rubber gum is not derived from the sap. It is secured from a milky juice, or latex, which is found only in the bark. This latex contains a substance known as caoutchouc, the active principle of rubber, together with certain albuminoids, resins, etc., which upon the evaporation of moisture coagulate, forming a thick, spongy substance. The percentage of caoutchouc, in proportion to other ingredients contained in the latex, determines the quality of the rubber.

The regions from which rubber gum is secured form an irregular belt in the tropics and sub-tropics extending around the earth, the quality procured varying greatly according to the species of plant, the soil and the climate. Great quantities are produced in Africa, Mexico, Ceylon and the Malay Islands, but the most desirable rubber for resiliency and wear resistance is secured from a tree found in the Amazon river district, South America. This rubber is known as Para, the name being derived from its chief city of export. It not only contains as high as 95 per cent of caoutchouc but the methods used by the natives in preparing it for market are so much superior that it

**EDITOR'S NOTE**—The following interesting story of the manufacture of rubber by H. S. Firestone tells of the history of rubber and its method of manufacture. Mr. Firestone was among the first makers to use solid rubber tires for horse-drawn vehicles and since then has worked continuously on the development of the pneumatic tire for motor cars.

is selected in preference to all others for the manufacture of motor car tires.

## Rubber Gathering Hazardous

Rubber gathering in the Amazon river district is a hazardous and difficult undertaking. The supply comes from wild trees scattered throughout dense forests, to which paths must be cut through the tangled and luxuriant undergrowth. Even then the trees can only be reached during 3 to 5 months of the year, as throughout the wet season the forests are completely inundated. The climate is so unhealthy that white men cannot do this work and it is necessary to rely upon the native blacks, who at best are undependable and lazy. Their reluctance to join rubber gathering expeditions can readily be understood when it is remembered that out of a season's expedition perhaps only half will return alive.

When a rubber tree is found the native gatherer cuts a series of gashes into the bark with his machete, encircling the tree from the ground up, as high as he can reach. Cups are fastened to catch the latex as it oozes out. When a sufficient quantity is collected it is removed to the temporary hut, where a dense smoke-producing fire is made of certain nuts and palm leaves. Then taking his wooden paddle the native dips it into the latex and holds it over the fire, turning it round and round until the latex coagulates. As soon as it is hard a new layer of latex is added and coagulated as before. This process is continued until the mass has grown too large for handling, when the paddle is taken out and the rubber set aside for export. In this form it is known as a ham or biscuit of Para. The process of coagulation and fumigation with these specially selected nuts and leaves prevents decay and adds to the life of the manufactured product.

## Tapping the Trees

Tapping the trees for rubber does not necessarily destroy them, nor is it believed to materially shorten their life; but unfortunately many thousands of trees are annually rendered useless by careless and improper methods. Although the source of crude rubber gum is practically inexhaustible, the limited native labor supply and the difficulties encountered up to the time of marketing it have tended to keep down the supply and maintain a high cost of production. The output has been increasing steadily, but has not yet been able to keep pace with the enormously increasing demand for manufacturing purposes.

In order to obviate the difficulties encountered in gathering wild rubber and facilitate production artificial cultivation has been resorted to in various localities. Scores of millions of dollars have been lost in ventures of this character, many of them merely wildcat-promoted schemes. It is estimated now, however, that there are 300,000 acres of rubber plantations in Ceylon and the Malay region and 100,000 acres elsewhere, principally in Mexico, some of which have already started to yield and promise handsome returns to investors.

## Ways of Collecting Rubber

In other localities rubber is collected and coagulated by a variety of methods. Africa, for instance, produces quantities of rubber from various species of vines, roots and even grasses which are destroyed in order to secure the latex, but which are rapidly replaced by new growth. These rubbers are designated by many different names, chiefly from their locality or the name of the native tribe gathering them. The methods of coagulation are very crude; some by evaporation, some by plant acids and others by smearing over the bodies of the natives. The proportion of caoutchouc in some of these rubbers runs as low as 60 per cent, but each has its own particular place in the general manufacturing field.

Next to rubber the most important material in a pneumatic tire is the fabric which gives form and rigidity to the tire. Extensive experiments have been made with all textiles to secure a fabric which in the finished condition will combine best with rubber, be unaffected by the chemical action in manufacture and demonstrate the greatest strength. Silk and linen show great strength, but when combined with rubber will not produce the results which can be obtained from cotton. There are many grades of cotton, the best of which is long staple Sea Island. It is erroneously supposed that this cotton grows exclusively on islands off the coast of South Carolina, but in fact only the seed comes from these islands, the supply being grown on the mainland. The next best cotton comes from Egypt, which grade for grade is estimated to average about 20 per cent less strong than Sea Island.

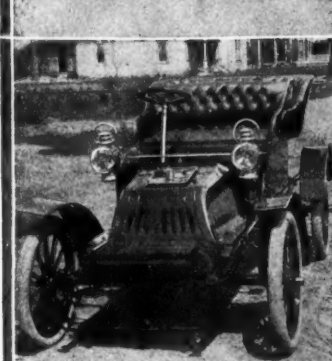
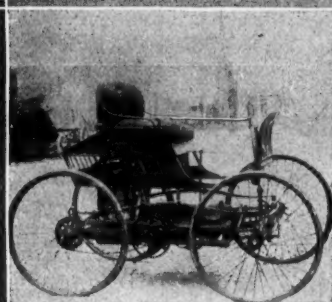
## Patents on Tires

There has been a great amount of thought, time and money devoted to the combination of rubber and fabric into a successful pneumatic tire and develop it to its present stage of perfection. The scope of this expenditure is well illustrated by the fact that 1,641 patents have been issued in the United States since the first one, May 8, 1847, to say nothing of the numerous patents on solid and cushion tires. It is needless to say that many of these patents have come to nought.



# An Industry's Progress of a Decade

By  
Thos. J. Fay

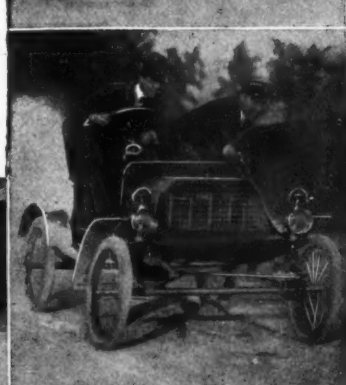
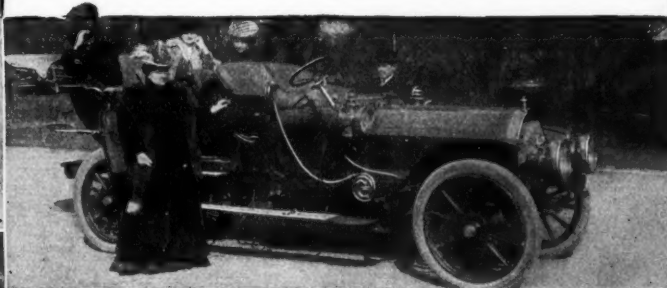


THE mother of invention should be mighty fond of the most youthful of her progeny, the automobile; as well she may. A decade ago the motor-driven car was but the dream of pioneers, out of which they awakened to be smote by the sunlit dawn of a new era. To scan the horizon of human endeavor but a few years ago would have disclosed the automobile as the merest speck, shrouded in mystery, and stayed by prejudice.

It would be to dip deep in the brine of lore, therein to find a theme wonderful in its ramifications, with never a chance of reflecting the splendid possibilities the future holds for this geocentric product, vastly portraying the genius of man.

With an abiding faith in the future of the automobile, considering well the dizzy height attained, the treacherous pathway, and the stragglers that ever bestrew the onward march of progress, it will not be amiss to render up an accounting of the assets, to countermarch that splendid galaxy, and thereby to lend confidence to such further efforts as progress dictates, egged on by necessity.

A résumé of current events, something by way of encouragement, and a stray remark, will scarcely be too much. In the pages to follow, then, the aim will be to discuss the automobile as it is, with perchance a reflection or two portraying the future trend and a resting place for mile stones.



# The Readers' Clearing House

The attention of Motor Age readers is invited to the pages of the Readers' Clearing House, a weekly department of from two to four pages in which questions by readers are answered in a technical, or semi-technical manner as the occasion demands, and in which criticisms and comments by readers are printed. This department is conducted expressly, as its name suggests, for the benefit of readers who have opinions to express on every phase of motor car construction and every aspect of motoring topics. It is intended as much for the garage man, as the car owner. These columns are always open to suggestions along new avenues of thought in motor car design or usage. All communications to it must be properly signed, which signatures will be published unless requested otherwise. Communications should reach Motor Age office not later than Tuesday noon of each week in order to appear in that week's issue.

## MOTOR AGE

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